

October • 1950

Finish

Make
"Ceramic"
 Your Headquarters

► For the cobalt you want . . . prepared as you want it . . . in any compound . . . in any mixture . . . call on "Ceramic", for "Ceramic" knows cobalt as required by the ceramic industry.

For many years we have specialized in the refining of cobalt compounds for the enamel, glass, and pottery industries. Our cobalt plant is one of the best equipped for the production of cobalt compounds as required by the ceramic industry; every step in the production being carefully controlled.

Whether your requirements are for the OXIDE, CARBONATE, SULPHATE, or for some SPECIAL COBALT COMPOUND, we can supply you promptly with dependable material. We would be glad to work with you on any specialty cobalt compound, for we are equipped for such production. Many of the leaders throughout the ceramic industry have standardized on "Ceramic" cobalt compounds. May we add you to our ever increasing list of satisfied customers?



Ceramic Cobalt
CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.

for
COBALT

- COBALT OXIDE
- COBALT CARBONATE
- COBALT SULPHATE
- SPECIAL COBALT COMPOUNDS



**We'll
 Send a Sample
 Pretested to fit
 Smoothly into
 Your Production
 Routine**

Talk about **CLEAN...**

You can work all day
with

**MACCO
DRI DRAW**

and not get a spot
on your shirt!



**Increases output...decreases rejects
even on extremely difficult draws--
without the usual splashing, dripping,
and objectionable mess around the press**

★ In addition, Macco Dri Draw offers other important advantages. It can be applied by inexpensive labor, cutting costs. Application can be made at one central point, eliminating the necessity for using hand labor at the various presses on the floor. Large size steel sheets can be coated and sheared to size later, saving handling. Blanks can be coated far in advance and then stored until they are to be drawn. Macco Dri Draw leaves a rust-proof coating which protects the metal from corrosion prior to cleaning. Also, it is soluble in water, and therefore easily removed in any cleaning bath. Macco engineers will be glad to show you what Macco Dri Draw can do for YOU in YOUR plant. No obligation, of course. Write or phone.

MACCO

PRODUCTS COMPANY

CHEMICAL COMPOUNDS

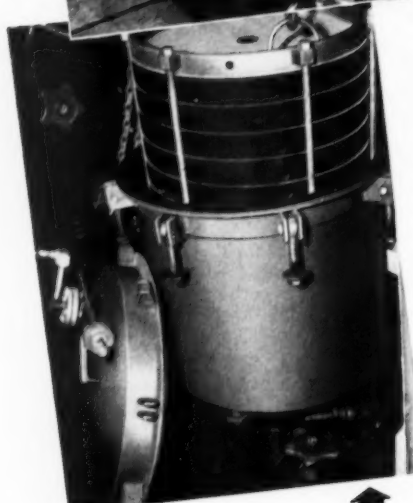
FOR THE METAL WORKING TRADE--SINCE 1931

525 W. 76th STREET ★ CHICAGO 20, ILL.

**No repairs or maintenance
in over 17,000 hours of
'round-the-clock operation**



**... yet this
SPARKLER
Horizontal Plate
FILTER
is still going strong**



Top: Sparkler Model 8-18 filter shown installed in Gillette's plating department.
Above: Same filter, with filter plate assembly being removed for cleaning

Left: Sparkler Model 8-6 stainless steel filter. This portable unit is used by Gillette to filter gold plating solutions.

The kind of service Sparkler Horizontal Plate Filters have given the Gillette Safety Razor Company—efficient and trouble-free, even under most extreme conditions—is the kind of service that is vital to every filtering operation.

For example: A rubber-lined Sparkler Model 8-18 filter is used by Gillette in the continuous filtration of a 1000-gallon bright nickel plating solution. Now operating for approximately two years, this filter has been on a 24 hours a day, 7 days a week schedule—without any loss of operating time for repairs or maintenance. Also used in periodic batch carbon treatments of nickel solutions this unit, according to Gillette technicians, consistently delivers a brilliantly clear effluent, even though the plates may be packed solid.

Another Sparkler Filter employed by Gillette is a Model 8-6, stainless steel, portable unit. Used exclusively for cyanide type plating solutions, this Model 8-6 has proved particularly valuable for Gillette's gold plating operations since the patented Sparkler Scavenger Plate assures minimum loss of precious gold solution. Now operating almost six months for at least 2 hours daily, its performance has been satisfactory in every respect.

Our Engineering Department (with more than 25 years' experience in every phase of filtration) is available for consultation without charge.

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS

From Editor's mail...

used for reference work in corrosion and protection course

Dear Mr. Chase:

I have enjoyed receiving the issues of "Finish", and I put them at the disposal of all the students. Graduate students taking a course in Corrosion and Protection use it in particular for reference purposes.

F. R. Morral
Associate Professor
Dept. of Materials Engr.
Syracuse University
Syracuse, New York

**has pioneered advancements
in metal finishing industry**

Gentlemen:

Since my first introduction to "Finish", it has been an inspiration to me, the way Dana Chase has pioneered advancements, progress and strength in the metal finishing industry.

I certainly appreciate the opportunity to be included for 1950 on the mailing list of "Finish," and have often felt a glow of pride that I had an opportunity for an even meager part in successful appeals for the materials necessary for the continued distribution of your valuable aid to an industry of such vital importance to the Nation in time of war and indispensable to the national economy in all times.

Lee Terry Williams
Consultant—Industrial Specialist
Many, Louisiana

Mr. Williams refers to the three months struggle during 1944 when finish was fighting for the privilege of using much needed paper stocks to continue publication.



finish SUGGESTION BOX

A new method of brazing and soldering

a "practically automatic" method that brazes seams at rate of 60 to 120 lineal inches per minute

A NEW method of brazing and soldering has recently been developed which is attracting a great deal of attention from shops where brazing or soldering is a part of their production applications. It was primarily developed to be used in connection with a suitable conveyor system, and, with such a setup, there is not only a great increase in speed but, in addition, a large saving in the materials used and a much cleaner and neater job.

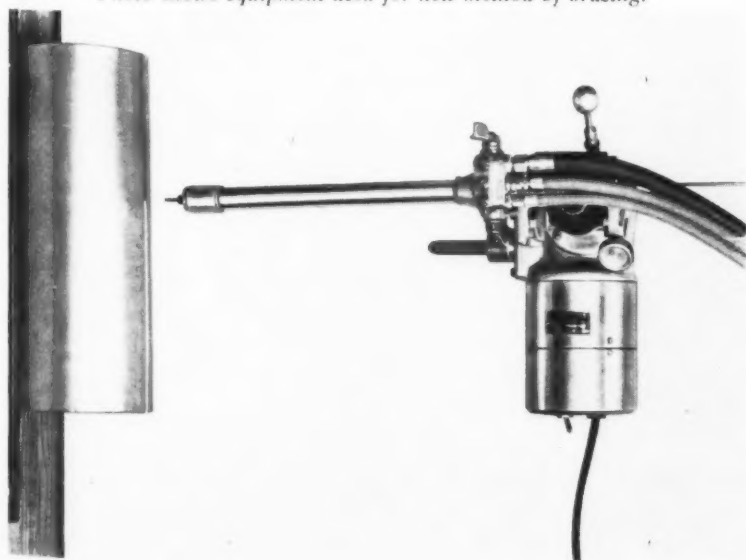
The brazing or soldering is done with a so-called "Gun" which is used to feed the brazing or soldering wire at some fixed speed which synchronizes with the speed of the workpiece being processed. The speed of the wire as it passes through the Gun can be varied to meet the requirements at hand; but, once adjusted to the required speed, maintains that speed indefinitely, and brazing or

soldering becomes a continuous operation.

The "Gun" is a self-contained unit which has been especially designed for use in connection with the applications referred to. It is powered with a constant speed induction motor to insure ample power and unvarying speed in operation. The unit can be started or stopped instantly, will feed the wire continuously or intermittently as desired, and once put in operation, it is practically automatic in performance. For melting the brazing or soldering wires, any of the combustible gases can be used.

As a rule, the Gun remains in a fixed position during the brazing or soldering operation, but in some cases the Gun moves and the work is stationary. In one installation it was found advisable to have the work and the Gun move together. It all depends on the nature of the workpiece

Photo shows equipment used for new method of brazing.



and what is to be accomplished.

Brazing

When set up for brazing, the Gun is usually mounted over the workpiece so the work will pass along under the Gun. The tube that guides the brazing wire is set in a vertical position as shown in the accompanying illustration. The end of the brazing tip is about $1\frac{1}{4}$ inches away from the surface to be brazed and remains fixed in that position.

For brazing, it has been found that natural gas and oxygen give splendid results. Fairly high gas pressures are used at the regulator to give accurate regulation, but small metering holes are used between the regulators and brazing tip so as to slow down the gas velocity at the tip. A fluxing gas is introduced into the natural gas line, and phos-copper wire is used for brazing.

The speed at which a seam can be brazed will depend upon the amount of copper required to fill the seam, the diameter of the wire used, and the gauge and material being worked on. In practice, it has been found that seams can be brazed at the rate of 60 to 120 lineal inches per minute.

The brazing operation is simplicity itself. The brazing wire is fed into the flame just fast enough so it falls in small drops and, these drops being enclosed in the flame, remain molten and enter the seam in that condition. Inasmuch as the heat and the brazing metal are confined and applied directly into the seam, it is obvious there is a minimum of loss both as to the gas and wire used. The brazing is done so rapidly there is little heat dissipation over the surface of the work.

In some cases it is necessary to use a small preheating flame which should impinge on the work about an inch ahead of the brazing flame. This is used when it is desirable to speed up the process or when brazing heavier gauge material. As a rule, no preheat is necessary when the brazing speed is less than 10" per minute.

Lead base soldering

For soldering with any of the lead base solders, the production setup is

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Ever doodle
like this?



WHEN YOU'RE DAYDREAMING perhaps you, like most people, find yourself doodling pictures of the things you want most.

Maybe there's a house you have in mind you'd like to build.

Or you're wondering which college you'd like your child to attend a few years from now. Or maybe you'd like to own a *brand-new* automobile someday.

One sure way to take your daydreams out of the doodling stage—and make 'em

come true—is to set aside part of your salary regularly in U. S. Savings Bonds.

Week after week, month after month, your savings will grow and grow and grow. Furthermore, in ten short years, you get back \$4 for every \$3 you set aside.

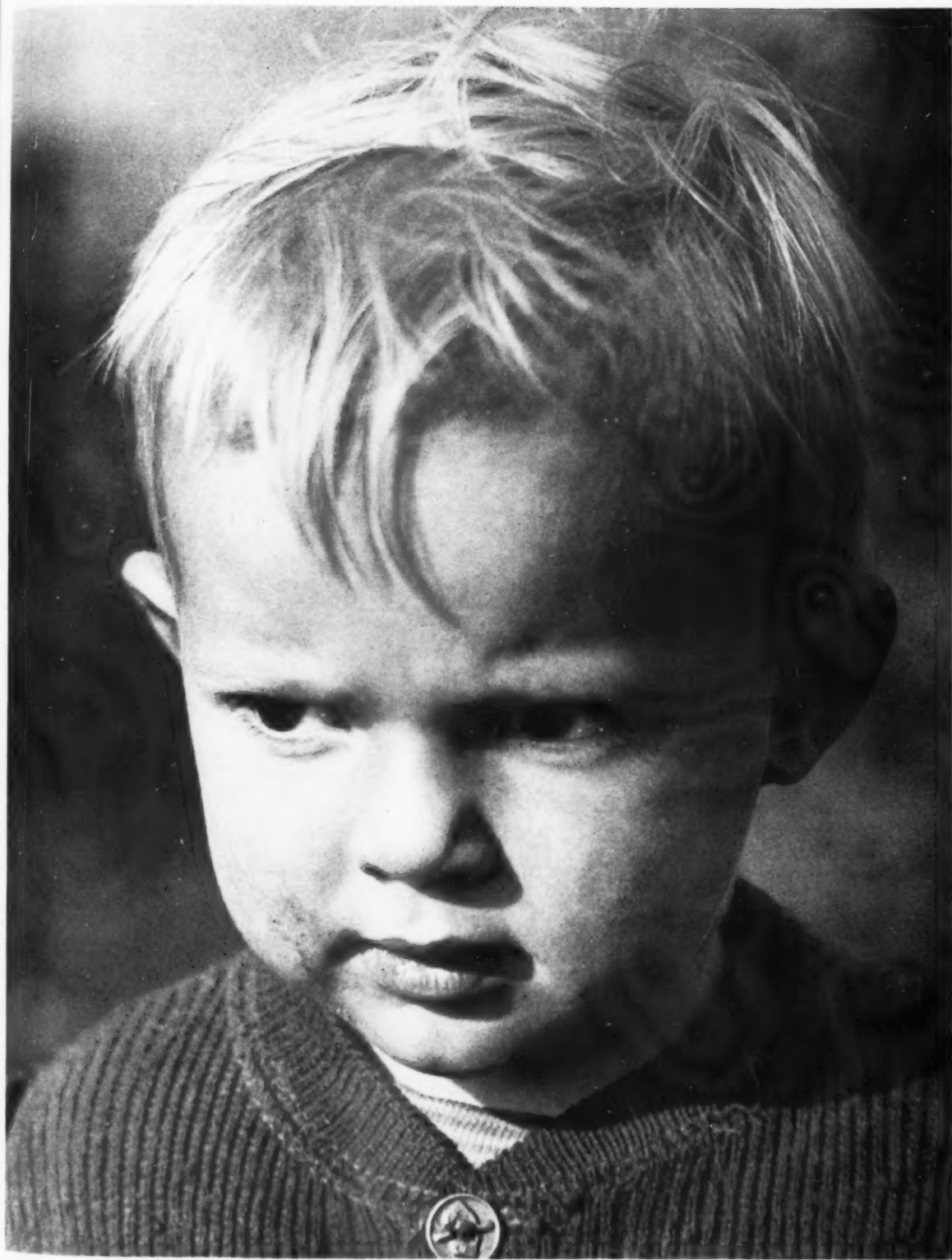
So sign up on the Payroll Savings Plan where you work, or the Bond-A-Month Plan where you have a checking account.

Start making your daydreams come true *right now!*

Automatic saving is sure saving—U.S. Savings Bonds



Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.



Camera: Graflex, 1/50 sec. at f/9
Film: Super Pan Press

"Meditation" By Gil Close,
finish correspondent

TEN DOLLARS will be paid any finish reader for a good quality black on white 8 x 10 enlargement chosen for this page.
Sports subjects or plant operations given preference.

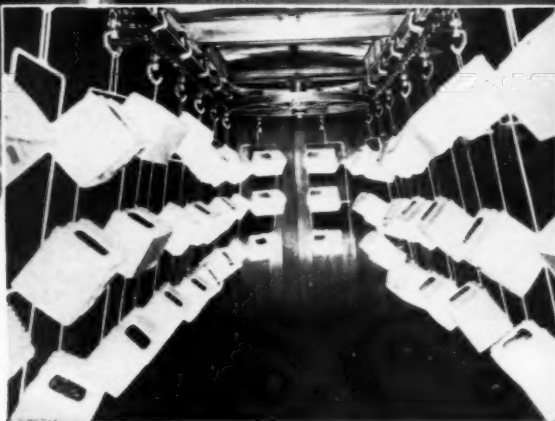
Here's why LINK-BELT Overhead Trolley Conveyors mean **REDUCED COSTS**

- THEY GIVE YOU**
- straight-line-production
 - gentle handling
 - accurate timing
 - much-needed floor space



Above: Porcelain enameled signs make the circuit into and out of a high temperature enameling furnace while suspended from Link-Belt Overhead Conveyor.

To right: Radio cases travel through synthetic finish drying oven on Link-Belt Overhead Conveyor.



No more confused, crowded production lines, no more rejects because of scratched surfaces or inaccurate timing when drying or aging. Link-Belt Overhead Trolley Conveyors make your ceilings pay dividends, release valuable workers from where heat, dust and fumes exist to more productive and pleasant work. Engineered and designed by Link-Belt specialists, they have many features which assure long service at low operating or maintenance cost. Send for a copy of Book No. 2330.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities:

12,095

LINK-BELT
OVERHEAD TROLLEY CONVEYORS

OCTOBER • 1950 finish

THE **finish** **LINE**

A DATE WITH A ROCKET will lead this personal story into a point of merchandising on which we have been "hammering" since the close of World War II.

A few days ago I received a very courteous letter from the general sales manager of Oldsmobile. The first paragraph reads as follows: "I am happy to learn that you recently 'Made a Date with a 'Rocket 8'' and had a chance to try Oldsmobile performance and comfort and handling ease on the highway." It was a very fine letter and I enjoyed receiving it. The only "catch" in the picture lies in the fact that I haven't had a date with a "Rocket 8" and have never set foot inside a new Oldsmobile. It seems a shame in this instance that perfectly good factory sales cooperation and followup was lost because of apparent inaccurate information from the retail agency.

The peculiar facts of the case are that just about 13 months ago I drove up to an Oldsmobile dealer's showroom in a suburb of Chicago, with full intention of buying a "98" convertible—there was a beauty on the floor.

The dealer soon made it quite plain to my wife and me that he was not interested in looking at our car for trade-in, and, as a matter of fact, it seemed quite evident that he was not very anxious to sell us a car, with or without a trade-in. Our reception could only be described as discourteous.

We soon forgot this incident, and purchased a Lincoln convertible, which is serving us very nicely and will probably lead to a repeat sale. When our son graduated from college, his choice was a Pontiac convertible. To the best of my knowledge, no member of our family has yet "had a date with a rocket".*

The dealer problem

The point in relating this personal incident is that it applies just as readily to the manufacture of a home appliance as it does to that of a car. Courteous letters from the factory can unquestionably do a great deal

to build good will and assist retail sales—if—they are based on correct facts furnished at the retail level.

Undoubtedly the car referred to is an excellent one and the manufacturing company equally fine—but—the picture that will remain most vividly in my mind when considering cars is that of the experience on the retail floor.

Getting down to appliances, there are still too many manufacturers who feel that they have done a good job once they have produced and "sold" at a rate of production sufficient to earn a worthwhile profit.

The fact remains, however, that no product is actually "sold" until it is in the hands of a satisfied customer.

It's an educational problem

Far be it from us to minimize the difficulty involved in "controlling" distribution, particularly at the retail selling level. This will never be a legitimate excuse, however, for failing to do everything possible to afford adequate sales training and educational information to all sales levels.

As we have said repeatedly, there are a few outstanding manufacturers who are doing a thorough job of sales education and training work from factory level to the retail floor. There are many more in the appliance field, however, who are continuing to concern themselves primarily with the production and "disposition" of their finished products without sufficient attention and cooperation at the retail level to insure a satisfied user, or, in other words, an actual "sale".

Dana Chase

EDITOR AND PUBLISHER

*P.S.—Jack Bain of the *finish* New York office arrived in a new "Rocket 8"—"98" before this page went to press. We have now "had a date with a rocket" and it's a smooth automobile.

You'll get better results, too, with

INLAND

ENAMELING IRON SHEETS!



Depend on INLAND for

- Greater enamel bond through special surface preparation.
- Extreme flatness—sheets stay flatter all through firing.
- Excellent sag resistance.
- Correct temper assured by frequent hardness and ductility tests.
- Unsurpassed drawing and forming qualities.
- Good weldability—and uniform composition and gage.

Inland TI-NAMEL*

—The revolutionary titanium steel sheet that eliminates the need for ground coating. Write for complete information.



INLAND STEEL CO., Dept. F100, 38 S. Dearborn St., Chicago, Ill.

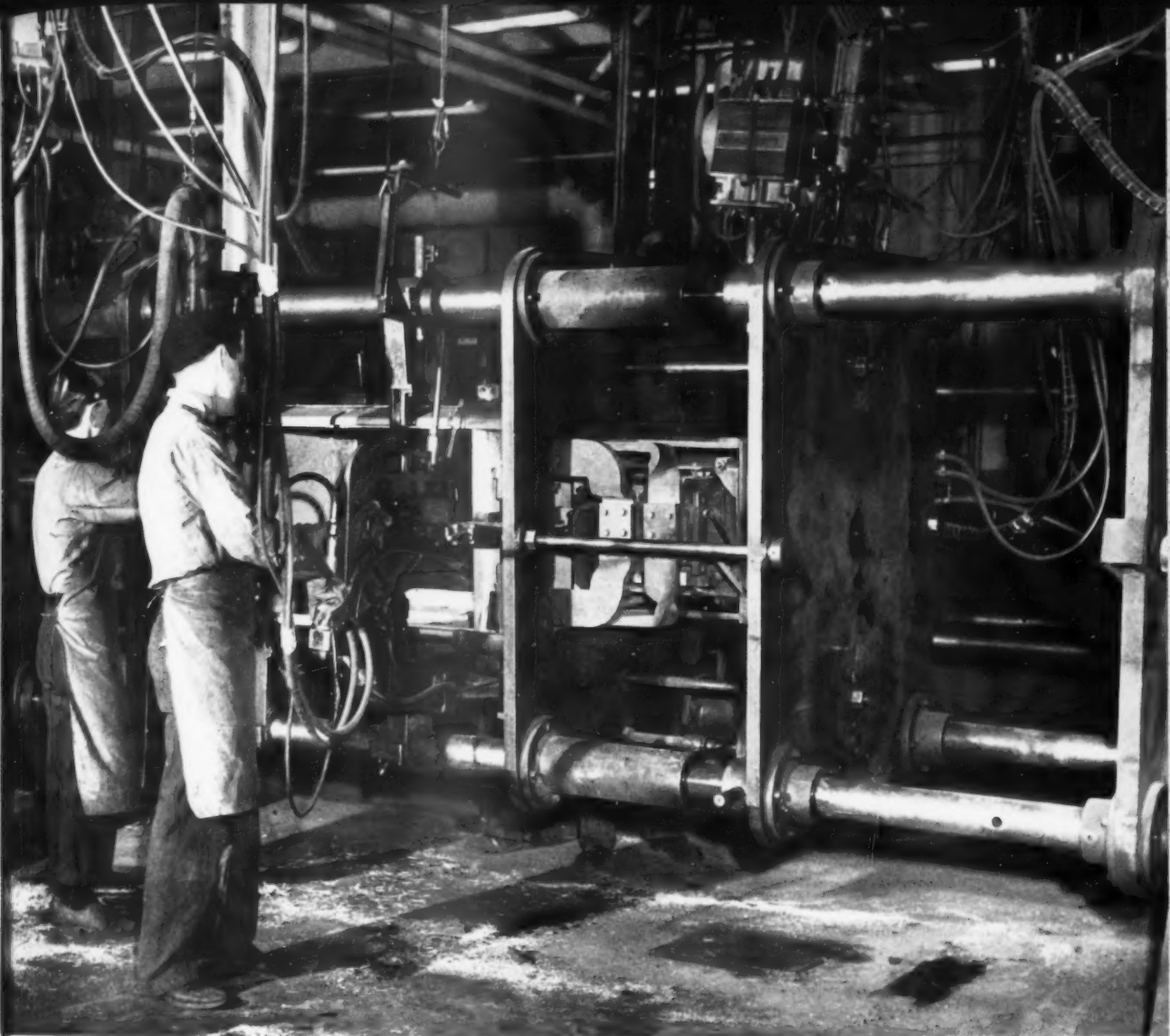
Sales Offices:

Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

Other Products:

Bars • Structurals • Plates • Sheets • Strip • Tin Plate • Floor Plate • Piling • Rails • Track Accessories

*Reg. U. S. Pat. Off.



Pressed steel panels are welded on huge jigs to start the construction of Coca-Cola cabinets.

The fabrication and finishing of Coca-Cola coolers

by *E. H. Wilkins* • WESTINGHOUSE ELECTRIC CORPORATION, SPRINGFIELD, MASS.

The bright red Cooler for Coca-Cola—a familiar and pleasing sight to millions—serves a dual function.

First, it must be a well-insulated and refrigerated cooler in order to keep bottled Coca-Cola cold, yet be rugged enough to withstand

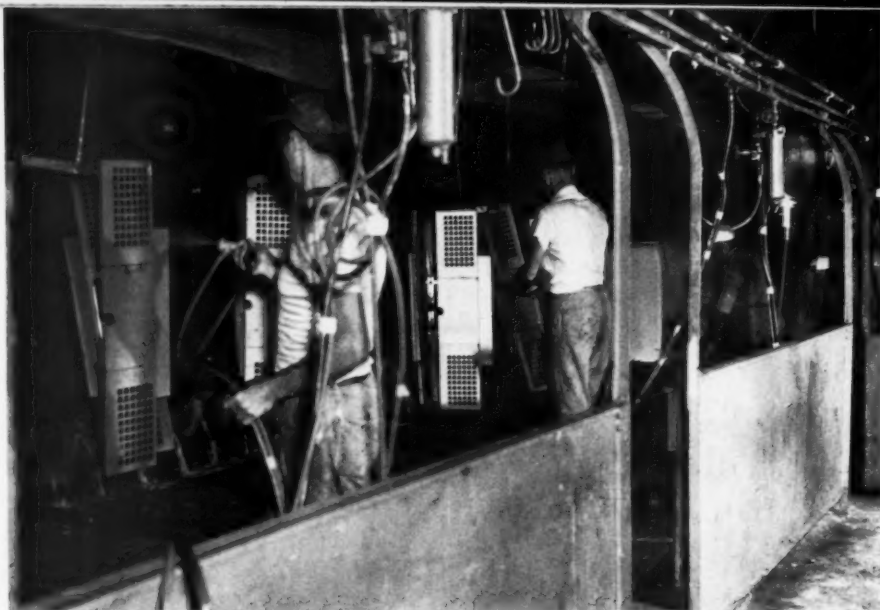
the wear and tear of everyday use. Second, since it is an advertisement for Coca-Cola, it must be neat and attractive.

Basically, a Cooler for Coca-Cola consists of four sub-assemblies: a cabinet, a tank, a lid, and a cooling unit. How all these sub-assemblies are produced in different parts of the plant and are ultimately brought to-

gether on the production line to form the gleaming, attractive Cooler for Coca-Cola, seen in the neighborhood store, makes an interesting production story.

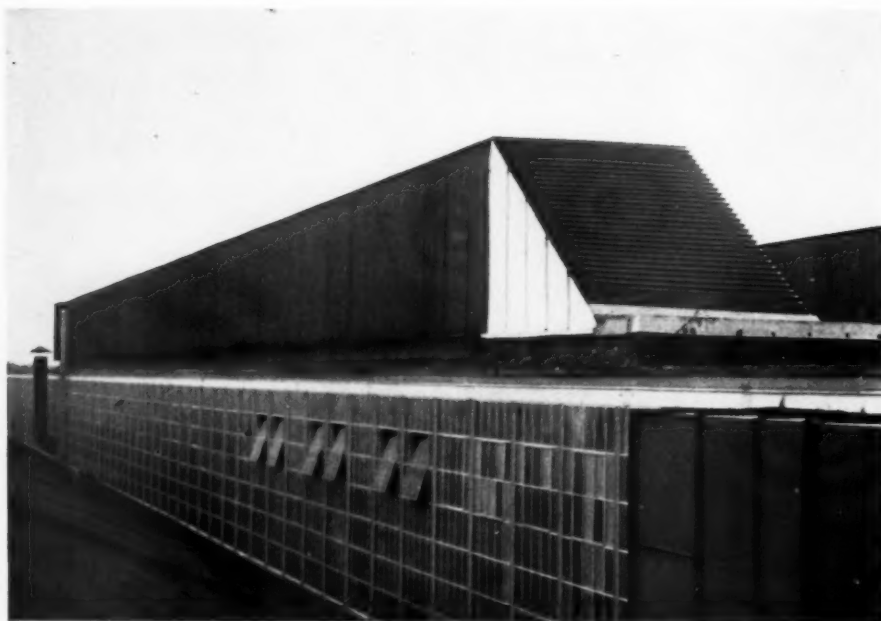
Fabricating the cabinet into a one-piece shell

As the first step in the fabrication of the coolers, the steel panels of the



Before reaching these spray booths, where the prime coat of paint is applied, cabinets pass through a degreaser where all traces of oil and grease are removed in preparation for painting.

*After r
cabinets
overhe
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place*



After the prime coat is applied, the cabinets continue on the conveyor through one of the 244-foot-long ovens located on the roof of the building.

*This p
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Coca-c
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ers fr*



From the prime oven, the cabinets pass through a sanding room where any imperfections in the paint are removed. From there, they go through a finish oven also located on the building roof. Photo shows cabinets after leaving oven on way to the assembly floor.

*Cooler
conve
Cola
on*

After reaching the assembly floor, cabinets are transferred from overhead chain conveyor to roller-type conveyor. Assembly of bats of insulation to the cabinet takes place at this point on conveyor.



This photograph shows the assembly of a stainless steel liner to a Coca-Cola cabinet. Chain conveyor in background carries liners from fabricating section to assembly.



Cooler units arriving on truck conveyors are added to the Coca-Cola cabinets as they travel along on this roller-type conveyor.





Final assembly and packing take place in this area. All cabinets are carefully wiped to remove any finger marks or traces of oil and dirt before being packed for shipment.

shells are shaped and pierced on huge presses. Additional reinforcing steel channels and braces are spotwelded to the panels for extra rigidity and strength. The panel sub-assemblies are then placed in a gigantic jig which uniformly positions and securely holds them while they are welded together to form a strong, accurately sized, one-piece, all-steel shell.

The welded cabinet shells are then placed on a chain conveyor, which carries them to and through a Bonderizer and thence to the paint booths where they are sprayed with a prime coat.

244-foot ovens are located above roof level

A trip through one of the 244-foot-long oil heated ovens on the plant roof is the next step on the chain conveyor. Here the prime coat of paint is baked on. The conveyor then carries the cabinet shell through the final paint booths where the finish coat of red enamel is applied. From

here the cabinets are conveyed through other ovens, where the finish coat is baked on. The gleaming red shells are next conveyed to the assembly floor where they are turned upside down and loading skids are attached. They are then transferred right side up to a roller conveyor where all seams, cracks, and openings are sealed with a compound to prevent "breathing" to the insulated area from the outside.

Insulation bats of glass fiber are next installed in the cabinets as they move along on the roller conveyor. The insulation is transported to the scene from the freight car siding by a chain conveyor.

Tanks fabricated of stainless steel

In another part of the plant the stainless steel tank is fabricated from panels using a double lock seam to mechanically hold the panels together. The seam is filled with soft solder to make a tight, leak-proof tank. The bottom panel had been

first prepared with a drain recess. A cover plate for this drain recess is now added in addition to a strainer top and the whole assembly is locked into place. The tank is tested for leaks, and then transported to the assembly floor by a different chain conveyor.

There the tank is inserted into the cabinets and rubber bumper gaskets are added around the top of the cabinet.

Final assembly and packing completed on roller conveyor

Meanwhile, the cooling units are assembled and tested in another area of the plant and are sent to the cooler assembly area on truck conveyors.

The cooler units are then installed in the cabinet assembly which is still traveling on the roller conveyor.

As the roller conveyor moves along, the lid assembly is added.

The final steps on the production line are cleaning, wiping, and crating the coolers for shipment.

Improved casting production practice

application of a special research report* saves 21.9% of molding and cleaning costs—skin dried molds replace oven baked molds for heat exchanger castings — casting surface finish improved

by R. J. Wilcox • TECHNICAL DIRECTOR, MICHIGAN STEEL CASTING CO., DETROIT

IN ORDER to improve the surface finish and cleanliness of generator end frame castings, the information contained in Research Report No. 18, "An investigation of the Surface Finish of Steel Castings," was utilized to distinct advantage. A group of four of these castings is illustrated in Figure 1. The solution of this immediate problem led to the extension of these developments to the manufacture of all other castings in the larger sizes ranging from approximately 500 pounds to 2000 pounds net weight. Extensive economies in manufacture and improvement in quality resulted from this improved method.

The generator end frame casting, shown in Figure 1, forms the frame of a large generator. It has an overall diameter of 60 inches and a depth of 16 inches and weighs approximately 1000 pounds net weight after cleaning. Approximately 1700 pounds of metal are used to pour this casting. The average metal section is 2 inches. The chemical analysis for the steel is as follows:

| | |
|-------------|-----------|
| Carbon | .25% max. |
| Manganese | .75% max. |
| Silicon | .60% max. |
| Phosphorous | .05% max. |
| Sulfur | .06% max. |

The generator end frame casting is molded in horizontal position as shown in the photograph, made in green sand, washed with a silica base mold wash and skin dried with a gas torch. It is gated through a 2-inch diameter down-gate located centrally in the casting. The down gate feeds

into four swirl-type in-gates which are connected to the smaller ring of the casting. The lower ring is fed by means of four blind risers with necked down cores. The upper ring is fed with open risers.

The in-gates were extremely sensitive to scabbing causing sand inclusions in the lower ring. Metal penetration to an objectionable degree was also present in the lower ring area of the casting. These conditions naturally entailed high cleaning costs and excessive rejections.

Corrective procedure

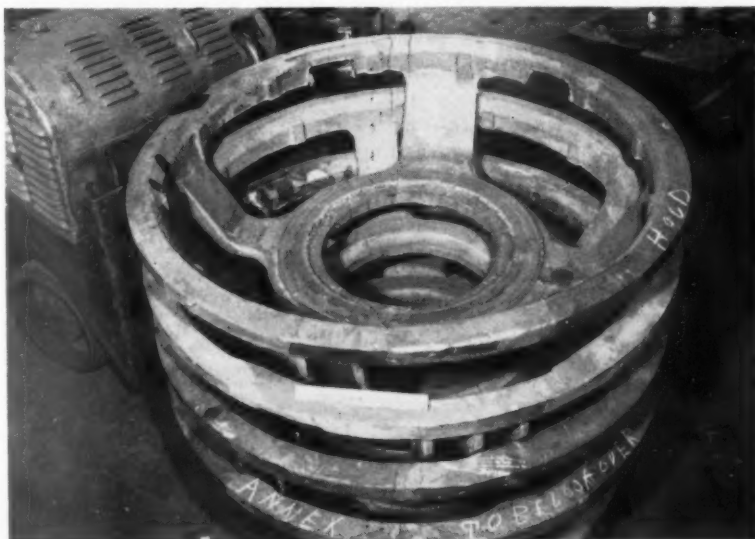
Soon after the publication of Research Report No. 18, preliminary studies were made with molding sand mixtures for the purpose of evaluating their resistance to metal penetration. The test casting used for this work is gated in the cope surface through a flat section 5/16 inches

thick. The "V" groove and the vertical walls are very sensitive to metal penetration while the gate area is sensitive to scabbing.

Using a washed and dried Ottawa sand having a 46 to 50 grain number as the base sand, this preliminary study indicated that the mold hardness of a specific mixture was the principal factor controlling penetration. The molding sand mixture finally arrived at as a result of this study and production experiences is as follows:

| | |
|------------------------------------|--------------|
| 800 lbs. Ottawa sand, AFA 46 to 50 | |
| 32 lbs. Western bentonite | |
| 8 lbs. Mogue | |
| 3.7 lbs. Dextrine | |
| 100 lbs. Silica flour | |
| Moisture | 3.2% to 3.8% |
| Permeability | 180 to 200 |
| Green compression | 6.5 to 7.5 |
| Density | 163 minimum |
| Desired mold hardness | 75 minimum |

Figure 1—Group of four generator end frame castings. Net weight of each casting is 1000 pounds. Castings are shown with gates and risers removed.



*Steel Founders Society Research Report No. 18.



Figure 2 — Steel header box heat exchanger casting. Net weight 1500 pounds. Casting shown as shaken out of mold and prior to shot blasting.

Effect of mold wash

With the preceding sand mixture, a trial production casting was made using a proprietary silica base mold wash and skin drying with a gas torch. This casting exhibited reasonably satisfactory surface quality; however, upon continued production, consistent gate cleanliness and freedom from penetration were not obtained. Even though the base sand mixture was generally satisfactory, sufficient protection and surface improvement was not being developed by the mold wash.

Since it was clearly indicated in Research Report No. 18 that all of the proprietary silica base washes developed approximately the same degree of surface finish, experimental efforts in studying other proprietary silica washes was not considered. As a result of the indications that a zirconite type of wash developed a superior surface to the silica washes, a trial casting was produced using the same green sand mixture but replacing the silica base with a zirconite wash. This wash was made up as follows:

- 7.75 lbs. Zirconite flour
- 15.25 lbs. Zirconite sand
- .50 lbs. Bentonite
- .75 qt. Core oil

The flour, sand and bentonite were mixed dry after which 3 quarts of water were added and mixed until a

uniform paste was developed. The core oil was then thoroughly incorporated into this paste and the mix allowed to stand over night. After standing, 4 1/4 quarts of water were added and thoroughly mixed. This resulted in a final wash mixture having a baume of approximately 75 and good brushing consistency.

The casting made with the sand as described and the mold wash indicated complete freedom from penetration and scabbing. All subsequent castings made with the same practice had surface finishes that were consistently uniform.

Production control

Since the use of the zirconite type wash was indicated as the major controlling factor in eliminating metal penetration and scabbing on heavy

merly required oven baked dry sand molds to obtain satisfactory cleanliness and surface quality are now made in skin dried green sand molds.

The casting shown in Figure 2 is typical of other castings which are being successfully made with this practice. This casting has a pouring weight of approximately 2500 pounds with a net cleaned weight of 1500 pounds. It is a header casting for a heat exchanger and is 60 inches long x 27 inches wide x 8 inches deep with an average metal section in the body of 1 1/2 inches. The illustration shows the casting as shaken out from the mold and prior to shot blasting. The excellent peeling qualities typical of this molding practice are evident.

Standardizations of wash

Further work with the zirconite wash revealed that simplified mixing and improved uniformity could be obtained by means of incorporating the zirconite sand and flour into a silica type base paste. The following mixture was developed:

- 10 qts. Delta special mold wash paste
- 100 lbs. Zirconite sand
- 50 lbs. Zirconite flour
- 15 qts. Water

To this mix is added a small quantity of purple aniline dye for purposes of wash identification. The dye is also useful in determining the proper end point on drying since it has been determined that for best results, zirconite type wash requires very complete drying and the development of higher drying temperature than those used with silica type washes. When the proper degree of drying is reached with the zirconite

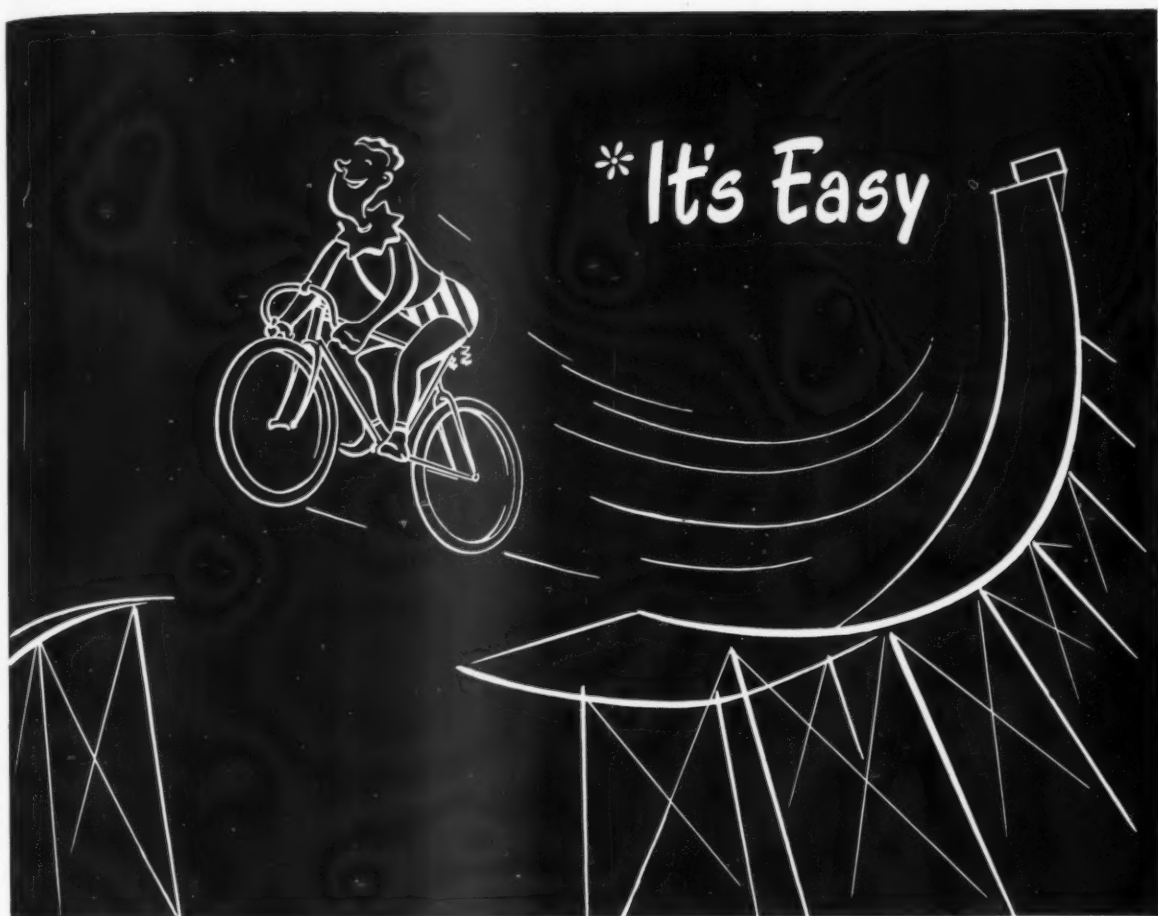
Molding and Cleaning Cost Estimates on Header Box Casting

| | Old Method | New Method |
|------------------------------|------------|------------|
| Molding and Closing | \$11.27 | \$10.00 |
| Wash and dry | 3.71 | .94 |
| Cleaning | 11.86 | 10.03 |
| Total | \$26.84 | \$20.97 |
| Difference (saving) | | \$ 5.87 |
| Per cent saving — new method | | 21.9% |

castings made in skin dried molds, this type of wash and molding sand was established as standard for the production of all castings of this class with the result that jobs that for-

containing the purple aniline dye, the bright purple color is almost completely destroyed and the mold surface takes on a brownish baked appearance.

to Page 72 →



* IF YOU KNOW HOW



Among other services, we are equipped to handle welding of all kinds, including seam welding, etc.

The thrill that can easily become a spill! But, calmly and confidently he swoops down the incline, clears the yawning gap and, to the amazement and delight of the onlookers, continues merrily on his way.

Bridging gaps, not jumping them, is one of New Monarch's specialties. By supplying a single intricate stamping, perhaps, or by completing a sub-assembly to fit into a production line, we are often able to assist a client in keeping his assembly line running smoothly and efficiently — to bridge the gap between loss and profit.

New Monarch offers you a service ranging from a single stamping to a Complete-From-Blueprint-To-Shipping-Carton program, including dies, jigs, stampings, finishing, assembly and packing. A staff of highly skilled and experienced craftsmen and the facilities of 3 modern plants are ready to help you.

Write today — or, better yet, send blueprints for consultation and estimates.



When you think of Stampings, think of

NEW MONARCH MACHINE & STAMPING CO.
406 S. W. NINTH STREET DES MOINES 9, IOWA

How to insulate finishing plant equipment

specific recommendations for the use of various forms of insulation
for a wide variety of applications

by R. L. Davis • SECRETARY, THE INDUSTRIAL MINERAL WOOL INSTITUTE, NEW YORK CITY



A major portion of the equipment used in the finishing plant is heated. And in order that finishing operations be successful,

the operating temperatures of this equipment must be closely maintained. Therefore, insulation in the finishing plant has an extra job to do in addition to its usual functions of conserving fuel, increasing the efficiency of high temperature equip-

ment, and preventing heat leakage into work areas. It must control the heat loss to an extent which permits close control of operating temperatures—often to within a few degrees.

To insure close temperature control, as well as to gain the advantages of low fuel consumption and maximum efficiency of heated equipment, it is imperative that plant equipment be properly insulated. The principal factors to remember when planning an insulation job are: (1) select the correct insulation for the job, (2) specify insulation thicknesses appropriate for the application, and (3) install the insulation according to accepted standards.

The following article gives application techniques and recommended thicknesses for applying molded, blanket, and block forms of mineral wool to pipes, cylindrical vessels, and sheet metal surfaces—all three of which are commonly encountered in finishing departments.

Insulating pipes

First, let us consider pipes.

Pipes up to 14 in. in diameter carrying contents up to 600° F. are insulated with single layers of mineral wool molded-type pipe insulation as illustrated in Figure 1. Recommended* thicknesses for various pipe sizes and temperatures are shown in Table I.

Figure 2 illustrates the "double-layer" steps commonly taken to insulate piping over 4 in. in diameter carrying contents from 425° to 600° F. Recommended* thicknesses for various pipe sizes and temperatures are given in Table II. Figures give

*Commercial Standard CS117-49 "Mineral Wool Insulation for Heated Industrial Equipment".

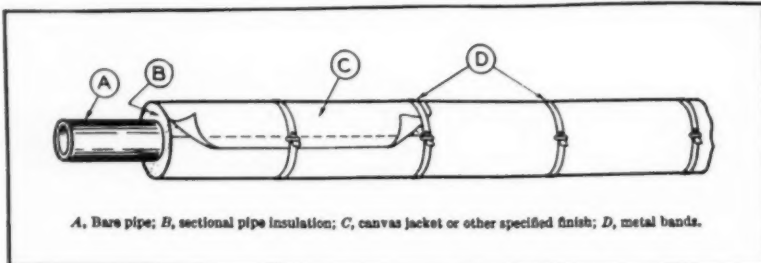


Figure 1 — Application of single-layer sectional pipe insulation.

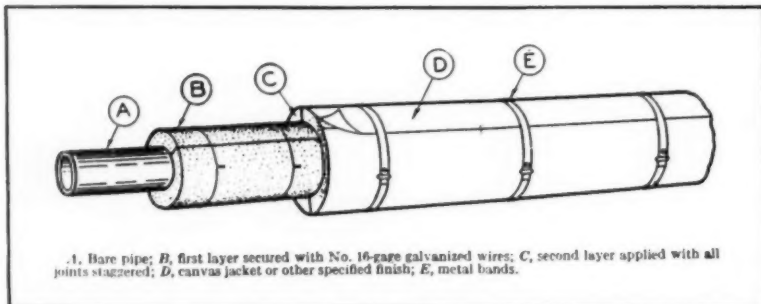


Figure 2 — Application of double-layer sectional pipe insulation.

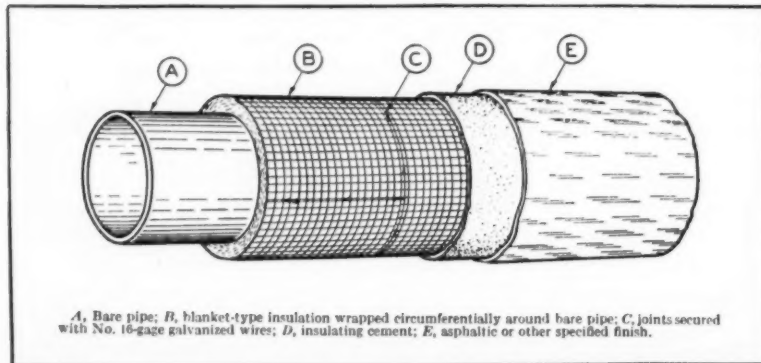


Figure 3 — Application of blanket-type pipe insulation on pipes.

total thicknesses. Each individual layer is one-half the total thickness.

Figure 3 illustrates the steps to follow in applying mineral wool blanket-type pipe insulation. This technique is used on large diameter piping (and ducting) and when pipe contents exceed 600°F. Recommended* thicknesses for various pipe sizes and temperatures are shown in Table III.

Figure 4 illustrates a technique applied to large diameter piping when temperatures are less than 600°F. Recommended* thicknesses are the same as for single and double layers of molded-type pipe insulation. (Tables I and II)

Valves, flanges, and fittings are generally insulated by building up layers of mineral wool insulating cement as indicated in Fig. 5. Cement thickness is built up in separate ¼ in. coats to allow even and thorough drying of under layers.

Cylindrical vessels

Tanks, heat exchangers, water heating units and other cylindrical equipment are insulated with either the blanket or block form of mineral wool. Installation steps are shown in Figures 6 and 7 and Tables 4 and 5 give recommended* thicknesses of mineral wool blanket and block forms for various temperatures.

Sheet metal surfaces

Sheet metal surfaces are perhaps of most interest to the plant operator—at least as far as insulation is concerned. For it is these surfaces—on ovens and ducts—which direct and house the most critical heat in the shop. To help maintain close temperature regulation insulation is a vital factor.

Most ovens are received at the finishing plant with the insulation already fabricated into the walls. Blanket, block, and loose forms are used. Manufacturers design their ovens, particularly high temperature ovens, so there is as little as possible "through metal" (i.e. metal bolts etc. running between the interior and exterior sheet metal surfaces of the oven walls). This "through metal" is undesirable because it supplies a path for heat to escape. Construction meth-

ods of avoiding "through metal" are usually protected by patents but generally comprise self supporting inner and outer sheet metal oven walls, between which insulation is sandwiched.

While ovens are usually insulated

by the manufacturer, ducts are insulated on location. Round ducts can be insulated by the methods applied to large diameter piping as previously discussed in this article. Rectangular ducting, of the size generally em-

Table I

| Temperature °F | Thickness of Molded-Type Pipe Insulation | | |
|-------------------|--|-------------------------|-----------------------|
| | Pipes below 2 in. | Pipes 2 in. to 4 in. | Pipes 4 in. and up |
| To 275 | 1 in. | 1 in. | 1 in. |
| 275 to 350 | 1 in. | 1 in. | 1½ in. |
| 350 to 425 | 1 in. | 1½ in. | 2 in. |
| 425 to 500 | 1½ in. | 2 in. | |
| 500 to 600 | 2 in. | | |

Table II

| Temperature °F | Double Thicknesses of Molded-Type Pipe Insulation | | |
|-------------------|---|--------------------------|---------------------------|
| | Pipes 2 in. to 4 in. | Pipes 4 in. to 12 in. | Pipes 12 in. to 14 in. |
| 425 to 500 | | 2½ in. | 3 in. |
| 500 to 600 | 2 in. | 2½ in. | 3 |

Table III

| Temperature °F | Thickness of Blanket-Type Pipe Insulation | | |
|-------------------|---|-------------------------|-----------------------|
| | Pipes 2 in. to 4 in. | Pipes 4 in. to 6 in. | Pipes 6 in. and up |
| 150 to 250 | 1 in. | 1 in. | 1 in. |
| 250 to 350 | 1 in. | 1 in. | 1 in. |
| 350 to 450 | 1 in. | 1 in. | 1½ in. |
| 450 to 550 | 1 in. | 1½ in. | 1½ in. |
| 550 to 650 | 1½ in. | 1½ in. | 2 in. |
| 650 to 750 | 1½ in. | 2 in. | 2 in. |
| 750 to 900 | 2 in. | 2 in. | 2½ in. |
| 900 to 1,050 | 2 in. | 2½ in. | 3 in. |
| 1,050 to 1,200 | 2½ in. | 3½ in. | 4 in. |

Table IV

| Temperature °F | Blanket Insulation | | |
|-------------------|--------------------|--------------------|------------------|
| | Thickness in. | Temperature in. | Thickness in. |
| Up to 300 | 1 | 700 to 900 | 2½ |
| 300 to 500 | 1½ | 900 to 1,100 | 3 |
| 500 to 700 | 2 | 1,100 to 1,200 | 3½ |

Table V

| Temperature °F | Block or Board Insulation | | |
|-------------------|---------------------------|-------------------|------------------|
| | Thickness in. | Temperature °F | Thickness in. |
| Up to 200 | 1 | 700 to 900 | 3½ |
| 200 to 400 | 1½ | 900 to 1,100 | 4 |
| 400 to 500 | 2 | 1,100 to 1,300 | 4½ |
| 500 to 600 | 2½ | 1,300 to 1,500 | 5 |
| 600 to 700 | 3 | 1,500 to 1,600 | 5½ |

ployed, is insulated with insulation blocks as shown in Figure 8. Recommended* thicknesses are the same

as when blocks are applied to cylindrical vessels. (See Tables IV and V) The techniques illustrated and de-

scribed in this article will, if applied to your plant equipment, give greater control of temperatures, conserve fuel, and increase operating efficiency. If you feel that your plant equipment is adequately insulated, test how many spots are too hot to touch—and remember—each of these is costing you money!!

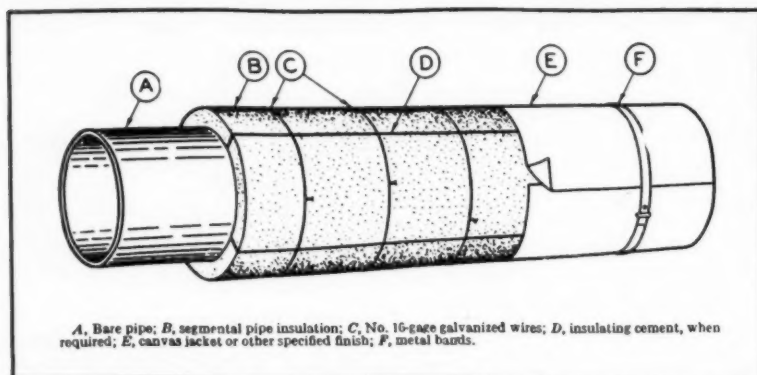


Figure 4 — Application of segmental pipe insulation.

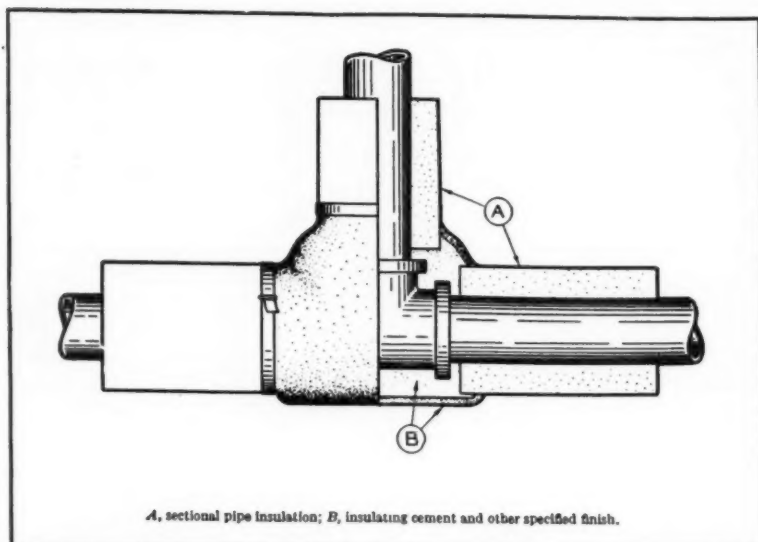


Figure 5 — Application of insulating cement to valves, flanges and fittings.

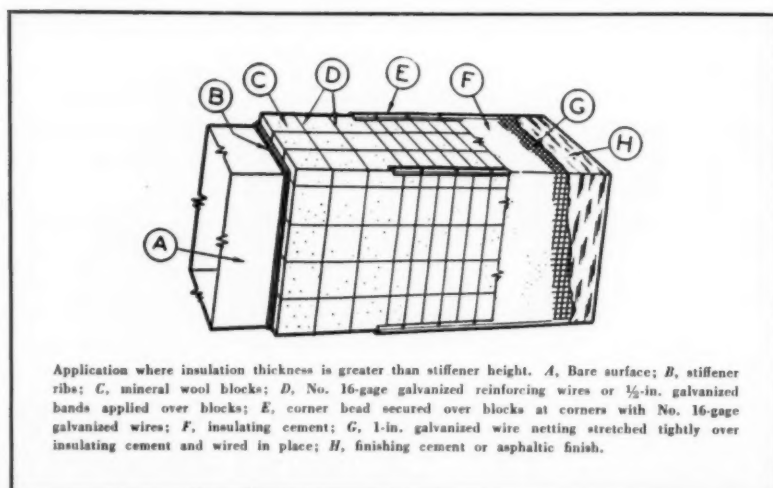


Figure 8 — Application of mineral wool blocks on flat or rectangular surfaces.

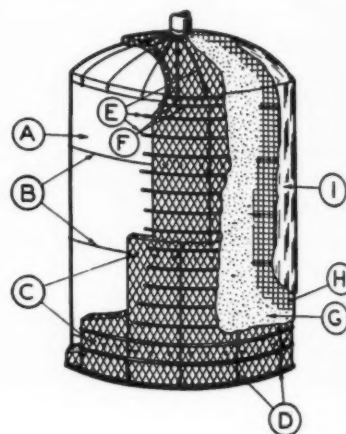


Figure 6 — Application of blanket insulation on curved surfaces.

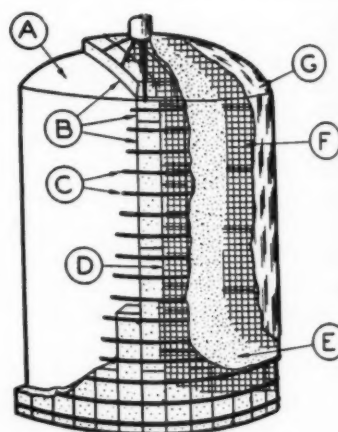


Figure 7 — Application of block insulation on curved surfaces.



All-Inconel radiant tube assemblies for use in pit-type carburizing furnaces. The radiant tubes were assembled by the Industrial Fabricating Company, Toledo, Ohio. The short-radius Inconel return bends were fabricated by the Commercial Metal Spinning Company, Toledo, Ohio.

Low Furnace Operating Costs with **ALL-INCONEL** Radiant Tube Assemblies

In practical terms, the use of all-Inconel® radiant tube assemblies means longer tube life, less down-time for repairs, and lower fuel bills.

Inconel resists corrosion, embrittlement, and destructive oxidation at temperatures up to 2000°F. Welded joints in Inconel have the same desirable characteristics as the alloy itself. These features mean long life and low maintenance for your Inconel radiant tubes. And you get lower fuel bills because the light walls possible with heat-resisting Inconel radiant tube assemblies give faster heating and require less fuel to bring your furnaces to working temperature.

One of the important factors leading to the availability of all-Inconel radiant tube assemblies is the development of the fabricated Inconel short radius return bend.

The Commercial Metal Spinning Company, Toledo

Factories Building, Toledo, Ohio, supply them to the following specifications:

- $3\frac{1}{2}$ in. O.D., on $5\frac{1}{2}$ in. centers
- $4\frac{1}{2}$ in. O.D., on 8 in. centers
- $5\frac{1}{2}$ in. O.D., on 8 in. centers

The O.D. sizes shown can be obtained on other center-to-center dimensions on special order. Fittings for tube sizes other than shown are presently being developed.

Cold-drawn Inconel seamless tubing is produced in a wide variety of diameters and wall thicknesses to meet any requirements.

For specific information about Inconel radiant tube assemblies, write directly to Inco.

Remember, too . . . our Technical Service Department always welcomes an opportunity to help you solve high temperature and fabrication problems.

THE INTERNATIONAL NICKEL COMPANY, INC. • 67 Wall Street, New York 5, N. Y.



INCONEL . . . for long life at high temperatures

The application of standard test methods

including test results from an industry-wide research program
and their correlation with "home use" tests for enameled utensils

by *F. A. Petersen*

RESEARCH PROFESSOR, DEPARTMENT OF CERAMIC ENGINEERING,
UNIVERSITY OF ILLINOIS

THE Enameled Utensil Manufacturers' Council has carried on a cooperative research project in the Department of Ceramic Engineering at the University of Illinois since 1940. In a single article it is not possible to recount even a small portion of the projects covered by this program, therefore I am going to limit the information to an illustration of how standard test methods developed on this project have been effectively used by this industry.

On the inception of this program a variety of tests were used in the industry. Each plant had its own

test methods and there was little or no correlation between test results obtained in the various plants. It was necessary that uniform test methods should be used in order for the test results to be used as an indicator in charting the improvements of the ware produced in individual plants and by the industry.

In order to eliminate as many variables as possible in the preliminary investigations, and still use a utensil as the standard test sample, the two-quart standard pudding pan was designed. It was desirable to use a utensil rather than test plates, so as

to have conditions of the metal and the processing similar to those used in manufacturing regular utensils. The use of a utensil as the test sample was also advisable since in the long range plans all standard tests were set up so that they could be run on regularly manufactured ware. The standard pudding pan has been of great value since test results on this test pan have been used in compiling data showing the progress made by the entire industry, particularly in evaluating the enamels in use.

Standard tests used since 1943

There are three standard tests which have been used in the industry since 1943; these are impact, thermal shock, and solubility tests. Data concerning abrasion resistance have been collected since 1946.

In setting up test methods one prime requisite has been that regular production ware, or a piece cut from such ware, can and should be used as the test samples. Using this approach the test values represent the properties of ware as produced, and they do not represent synthetic values obtained by the testing of laboratory prepared specimens.

The test methods were set up so that a classification of the ware tested was possible. The thermal shock test, particularly, had to be revised quite a few times in order to obtain a classification. At the present time it is felt that the thermal shock test as constituted will effectively classify the ware, and, when all samples tested have a perfect rating, further classification is not necessary since the ware will withstand abnormal abuse before failure. It was not the intent of the technical group to set up a test which evaluated abuse, but the improvements in this property have

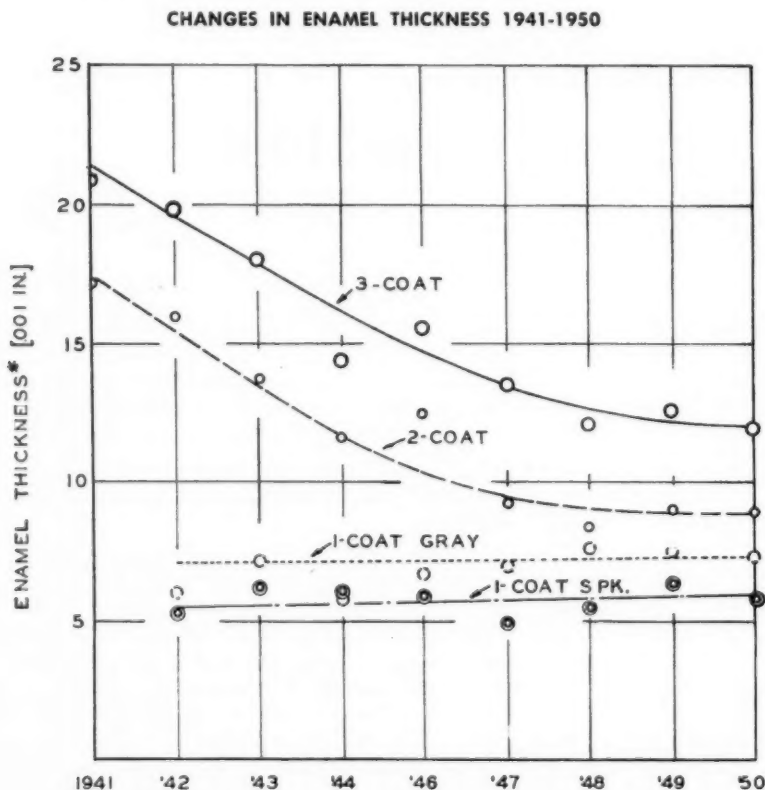


Figure 1—This chart shows that enamel thickness of multiple-coat ware has been progressively decreasing over the period of test. (*average for year)

been rapid and almost automatic with the type of enamels now used.

A main objective in all of the work has been to develop all properties simultaneously, when and if possible. This was possible to some extent when the old type cover enamels were used, and it is a simple matter when titania opacified enamels are used.

The accompanying charts indicate the changes that have been made by the industry during the past ten years. In the matter of thermal shock, solubility, and wear resistance these charts do not indicate the true picture, since complete data for the entire period is not available. It should be pointed out that these values are the average values obtained by testing of ware submitted by the entire industry.

Enamel thickness

The enamel thickness of all ware tested has been determined using a magnetic thickness gauge. It is a well known fact that erroneous results can be obtained using any instrument if a correct procedure is not used. In all of our tests the instrument was carefully standardized using a pan of the same size and shape as the test pan and fabricated from the same type and thickness of metal. In order to further simplify this measurement the readings were made on the flat portion of the pan bottom both inside and out (five points each side). Comparisons have been made with other types of thickness gauges and comparable results are obtained if the standard procedure is used. If the enamel coating is extremely thin, three mils or less, it is necessary to use a special instrument to obtain consistent results.

The enamel thickness on the pan bottom may not be exactly the same as on the side walls, bead, or bottom radius, but it is representative of the coating on the utensil. The greatest variation is between the enamel thickness on the inside and the outside of the pan, and this is dependent upon the method of placement after dipping.

Figure 1 shows that the enamel thickness of multiple-coat ware has been progressively decreasing over the period of test. There has been

finish OCTOBER • 1950

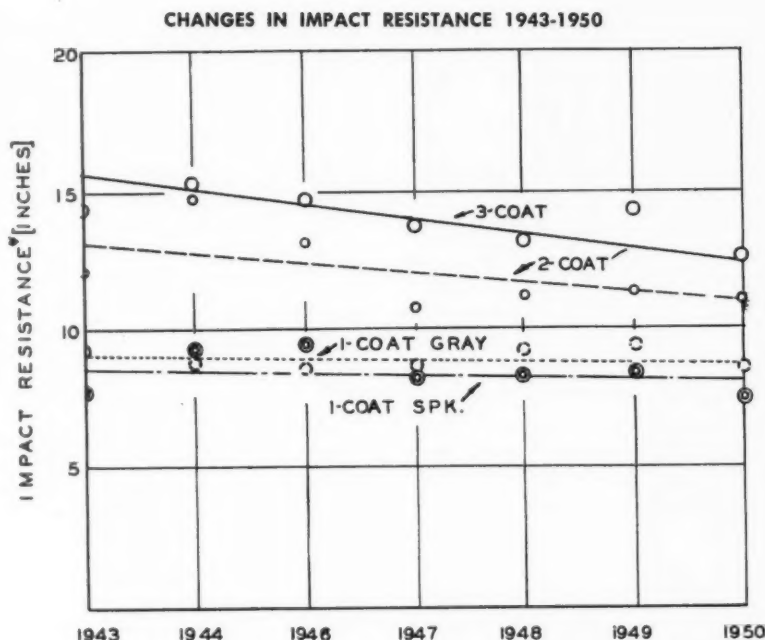


Figure 2—Evidence of the change in impact resistance over the period from 1943 to 1950. (*average for year)

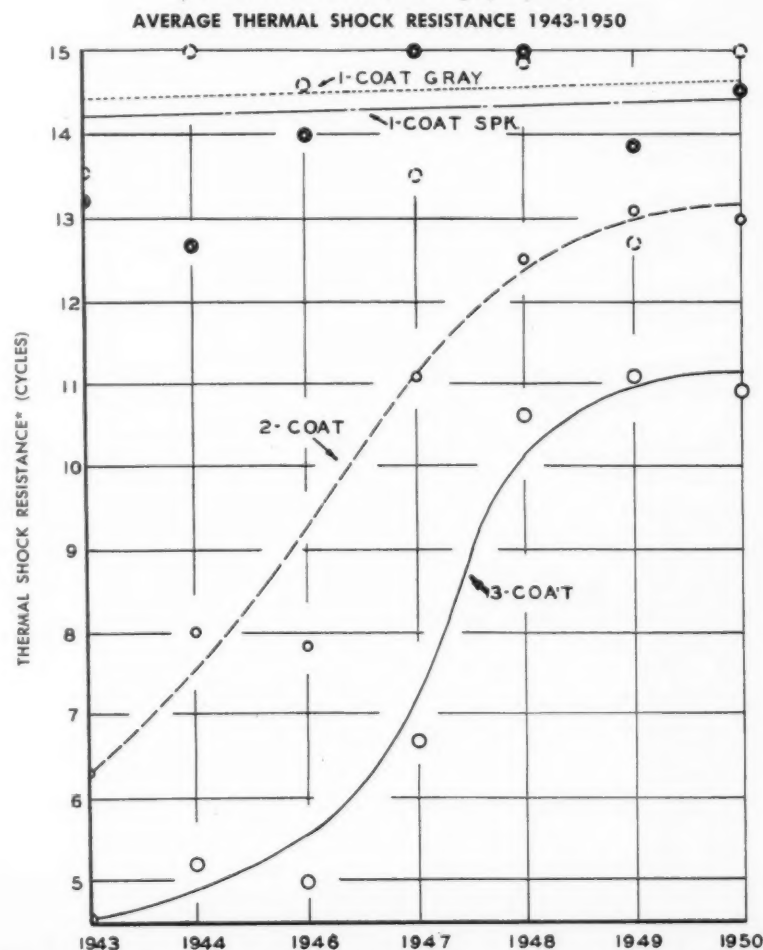


Figure 3—This chart shows the marked increase in thermal shock resistance of multiple-coat ware. (*average for year)

a tendency the last few years toward a levelling off at a minimum coating thickness. This minimum thickness is greater than in portions of the flatware industry because of the complexity of the shapes, and because dipping is a manual operation.

The thickness of one-coat enamels has remained fairly constant. The one-coat gray enamels are applied heavier so that the contrast in color between the mottled and unmottled areas is maintained. The one-coat enamels are applied heavier than normal ground coats so that a continuous coating is assured, particularly on the bead and bottom radius.

Certainly a portion of this decreased thickness is due to improved control in the plants, and the recognition by the plant technical man of the advantages of a thinner coating. A decrease in enamel thickness means

a considerable saving especially when the enamel cost is a substantial portion of the cost of the finished product.

Impact resistance

The impact resistance of enameled utensils is determined by controlled impacts on and normal to the bottom radius. This point was chosen for test since most impact failures occur on the bottom radius. Impact resistance is primarily a function of the ability of the enameled shape to deform—either elastically or plastically.

An important factor which affects impact resistance is the physical structure of the enamel layer. In all work done thus far in an attempt to increase impact resistance by change in enamel formulation, the results have been negative. The impact resistance can be increased ap-

preciably by increased enamel thickness, but this method is not used since it will cause a decrease in thermal shock resistance, increase costs, and possibly lead to other difficulties. Improvements in impact resistance can be achieved by redesign of the utensils. Larger bottom radii will increase impact resistance, but there are limits to the size of the bottom radii depending upon the size of the pan and the ability to draw a radius without producing wrinkles. Increased metal thickness will also increase impact resistance.

Figure 2 points out the changes in impact resistance over the period 1943-1950. It can be seen that there is a slight decrease in resistance of the multiple-coat ware to impact. This decrease is certainly not as great as would be expected when the decrease in enamel thickness is taken into consideration. Regular shapes other than the standard pudding pan, which has only a $\frac{3}{8}$ " radius, have not shown a marked decrease, but likewise they have not shown the marked improvement noted in other properties.

Thermal shock resistance

Thermal shock resistance is a very important property of enameled utensils, since this is a type of failure which occurs in use and therefore is very objectionable. The use of titania enamels and thinner coatings has practically eliminated thermal shock failures, unless the pan is severely abused.

Figure 3 shows the marked increase in thermal shock resistance of multiple-coat ware. One-coat enamels have always had very good thermal shock resistance because of the thin enamel coatings.

The chart indicates a leveling off of thermal shock resistance during the last few years after a rapid rise. This is due to the use of enamels which have a higher expansion. These types of enamels are used since they are somewhat softer and are less prone to shatter spontaneously at sharp radii.

Solubility resistance

The resistance of enameled utensils to food acids is a very important

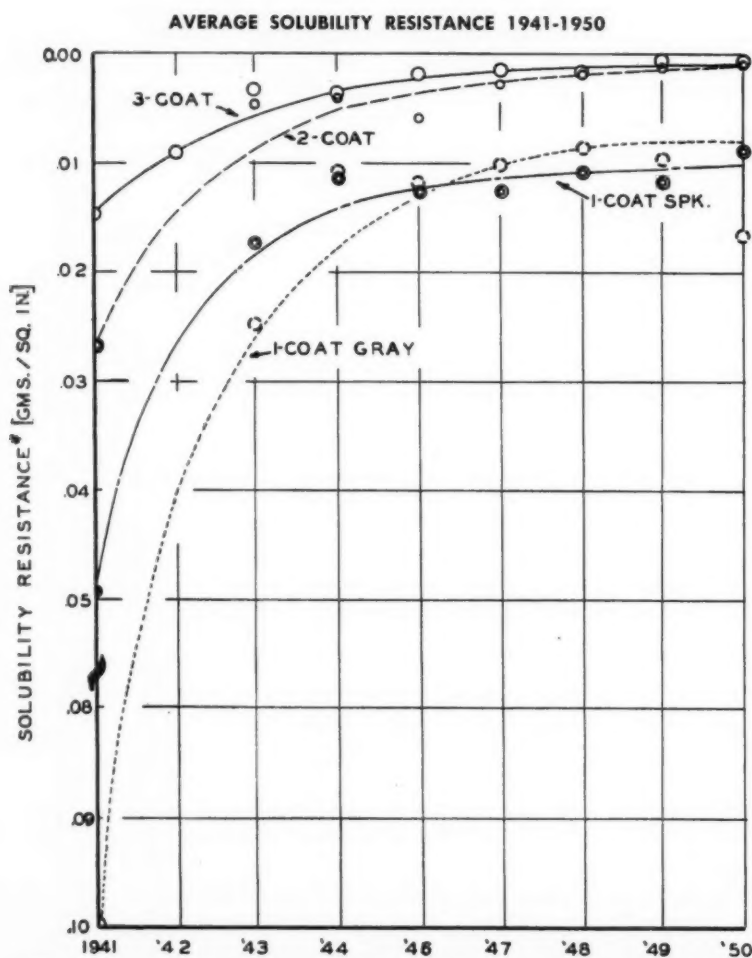


Figure 4—This chart shows how all of the various types of enamels in use have been markedly improved in solubility resistance. (*average for year)

property of the enamel coating. The conditions of test are comparable to regular cooking use in that a boiling organic acid (6% citric) is used. This property is very important since acid attack will cause loss of gloss and once the gloss of the enameled surface is destroyed it is very difficult to clean the utensil and it loses one of its major advantages—ease of cleaning. As a rule three-coat enamels have greater solubility resistance than two-coat enamels. This is very likely due to the added firing treatment, and the more complete freedom from irregularities in the coating. These irregularities are very minute pinholes which are not noticeable even on close inspection, but are a starting point for acid attack.

The one-coat enamels as a rule have lower solubility resistance since they are used on items such as roasters and canners, which are not generally subjected to severe service conditions. These coatings, since they are directly over the steel, are also more permeable and therefore are subject to local attack.

Figure 4 indicates that all of the various types of enamels in use have been markedly improved in solubility resistance. The one-coat gray enamels indicate a decrease the last year, but this is not a fair picture since only two samples were tested. This is due to the production of a new type gray finish which is superior to the regular mottled grayware.

Wear resistance

Wear or abrasion resistance tests are very important to the porcelain enameling industry, because they highlight a very definite advantage of porcelain enamels, that is their ability to withstand abrasion.

Various test methods have been tried to evaluate the wear resistance of porcelain enameled surfaces. We have used the Taber abraser for tests run the last five years, because it is a simple test to run and it classifies the enamel tested. It has one drawback and that is it does not give an exact classification of very good enamels. However, it will invariably pick out the poor enamels.

Wear resistance is a function of the structure of the enamel. Enamels

containing many large bubbles will have poor wear resistance. Likewise, if an enamel is overfired and contains bubbles at the surface the wear resistance is poor. Another factor that causes decreased wear resistance is an uneven surface, that is, one that is streaked, or rough. Wear occurs first at any irregularity protruding from the surface, and once the interior of the enamel layer is exposed attack takes place quite rapidly.

Figure 5 shows that the wear resistance of multiple-coat ware has been improved appreciably during the past few years. This increase is largely due to the use of titania enamels, lower clay additions, and the elimination of opacifiers some of which were quite detrimental to wear

resistance. The decrease in the wear resistance of the one-coat enamels is not as surprising as the high values obtained earlier. Normally, one-coat enamels of the speckled type have lower wear resistance than multiple-coat ware since the bubble structure is more profuse and the speckles are ideal points for wear to begin.

The results listed for each point in the figures represent the average values for tests made on from six to fifteen sets of test samples. These data are a compilation of test results gathered over the period 1941-50.

Whenever standard tests are used there is always a question as to whether or not the test results actually indicate the ability of the tested ware

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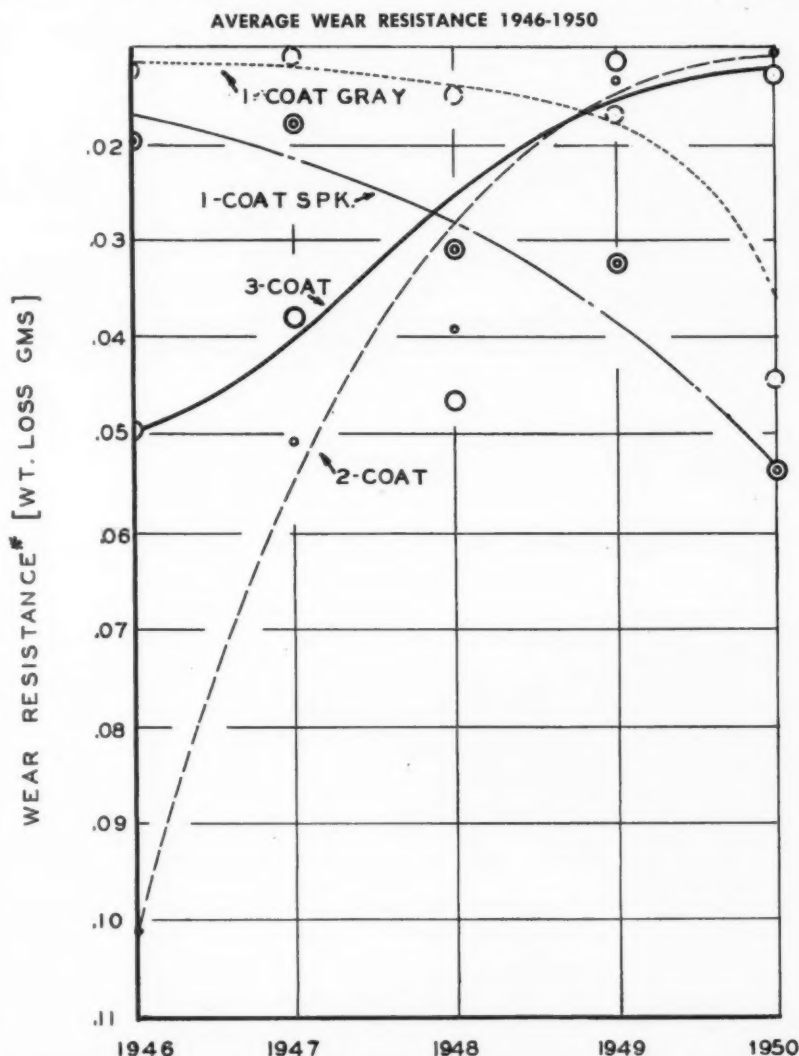


Figure 5 — Demonstrating that the wear resistance of multiple-coat ware has been improved appreciably during the past few years. (*average for year)



New type street sign saves taxpayers money



Showing first operation (stud welding) in the application of Chicago's new street signs which are said to be saving the taxpayers \$400,000.

CHICAGO taxpayers received a good bargain recently as the first of the city's new acid-resistant street name signs went up in the Loop. Whether they all realized it or not, each of the 67,000 two-faced porcelain enameled signs to be erected in the largest single street name sign erection project of all time will cost only \$1.67 because of the basic new design developed by one city employee after the city started its sign shopping two years ago. At that time, the lowest acceptable bid was \$7.65.

That's only part of the story behind the new street name signs which Ralph Michel, associate traffic engineer of the Bureau of Street Traffic, developed in an effort to find a single simple solution to the manifold problems of low-cost production, economical installation and maintenance, and lasting visibility and life.

Fifty types available

While Michel has shared responsibility for the development of the city's traffic control signal system and many other traffic matters during his 28 years in the department, he started to work nights on the street name sign problem when he couldn't find a satisfactory answer in any of the 50-odd types on the market. Before long his basement work shop at home began to look like a street name sign museum. He had gathered samples of every type that he could get his hands on.

Trying one design after another for more than six months, he finally hit on the universal solution, on which he has applied for a patent. Meanwhile, he has licensed the City of Chicago to use the design without cost. Betteinger Enamel Corporation,

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Mayor Martin Kennelly (right) and George Kells, alderman, watch L. M. Johnson, commissioner of streets and electricity, attach first sign to steel studs welded to pole.

OCTOBER • 1930 finish

PEI shop forum for plant men

record attendance at the 12th annual shop practices forum for plant men, sponsored by the Porcelain Enamel Institute, at the University of Illinois

PLANT MEN attending the 12th annual Shop Practices Forum sponsored by the Porcelain Enamel Institute broke all previous records in total registration and in attendance at the various sessions. Approximately 250 persons registered for this year's Forum held at the Illini Union Building on the campus of the University of Illinois, Urbana, Ill., September 13, 14 and 15.

Dr. A. I. Andrews, head of the Department of Ceramic Engineering, University of Illinois, presided at the opening session Wednesday afternoon, September 13. He introduced Dean W. L. Everitt, of the College of Engineering, who presented the "address of welcome."

In response to Dean Everitt's message, F. L. Meacham, of Avco's Crosley Division, and Institute president, thanked the University of Illinois which, in cooperation with Ohio State University, provides the Institute with academic surroundings for its annual shop practices meetings. Continuing, Meacham urged the porcelain enameling industry to concentrate upon improved materials, equipment and manufacturing methods to face the challenge from other finishes which are growing more competitive in more fields.

The Wednesday afternoon session on "New Application Methods" was probably the one of most interest to the practical enamelers. Some of the other sessions were of more interest to the technical and laboratory men, although the practical enamelers showed much interest by their constant attendance at all the meetings.

Papers presented at the Wednesday session were: "Dry Drawing Lubricants," by Richard F. Roy, of Gilon Products Co.; "Magnetic Separation as Applied to the Black Specking Problem," by John T. Roberts, of Crane Company; "Spalling of Porce-

lain Enamel under Repeated Freezing and Thawing in the Presence of Moisture," by R. J. McEvoy, of University of Illinois; and "The Operation of Ball and Pebble Mills," by O. H. Garlick, of Paul O. Abbé, Inc.

Roll coating machinery for applying drawing compounds

In his paper, Richard Roy brought out the fact that new machines are being built and operated for a "new complete method of applying dry drawing compounds. These machines perform all the operations involved in the complete cycle of application. . . . The blanks are cleaned, rinsed, coated and dried. . . . The cleaning is performed with an alkaline cleaner and revolving brushes, and the blanks are spray rinsed. The blanks are then coated with special coating rolls and passed on to a drying compartment which is thermostatically controlled to insure proper drying of coated blanks. This chamber may be heated with gas, electricity, or steam coils as desired."

The black specking problem

John Roberts, in his interesting paper, pointed out that there are many causes for black specking on porcelain enamel ware, but his discussion pertained to black specking as caused by iron contamination in the slip, and the detection and removal of the iron.

The speaker suggested that specks first be photographed, and then removed from their surroundings for the purpose of study by a leaching process (for non-acid resisting enamels) using a 1:1 solution of hydrochloric acid. Specks in acid resisting enamels may be removed for study forcibly by means of a Stellite rod.

In testing for total iron content, Roberts pointed to the use of a method used in the Crane labora-

tories. A one-pound sample of enamel is screened through a plastic funnel across the face of a magnet. The iron particles in the falling stream of enamel powder are collected on the surface of an attached plastic sheet. The enamel is passed through the unit four times: once in the dry state, once dry into water, and twice slurry into water. The residue is collected, dried, studied, and weighed after each pass.

Roberts concluded that "Enamel powders or slips can be readily checked for total iron content. Those which show excessive amounts of iron should be cleaned by magnetic separation. Work should be done toward the elimination of the iron at its source. The operation of a magnetic separator should be carefully supervised, particularly regarding enamel feeds."

"Inside a ball mill"

The enamelers were taken "inside a ball mill" by Oakley Garlick who presented an interesting technicolor movie showing the inside operation of a ball and pebble mill. The slow-motion movie graphically emphasized that the "angle of break for frit grinding should be about 50°, and to attain this, the operating speed should equal 55 to 60% of critical." The movie permitted the plant men to see the effects on frit grinding by mills operating outside of the "55 to 60% of critical" range.

The other sessions

Thursday morning's session, presided over by Conrad W. Given, of Great Lakes Steel Corp., consisted of two symposium's. The first symposium was on "One Coat Porcelain Enamel Directly on Steel." Panel members included: D. R. Goetchius (leader), Ferro Enamel Corp.; John J. Krivec, Murray Corp. of America; Paul Cecil, Strong Manufacturing



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Above: These members of the "board of experts" are, left to right: H. W. Alexander, Frigidaire; Dr. A. I. Andrews, University of Illinois; D. S. Beal, Youngstown Sheet & Tube; M. Bozsin, Ferro Enamel; G. A. Cairns, Macco Products; and R. R. Danielson, Metal & Thermit.

Left: Shown presiding at the meeting of the "board of experts" is Dr. G. H. McIntyre, of Ferro Enamel.

Below: Other members of the "board," left to right: J. L. McLaughlin, Chi Vit; E. E. Marbaker, Hommel; M. L. Pouilly, DeVilbiss; David Root, Hotpoint; N. H. Stolte, Enamel Products; M. H. Whitehead, Canton Stamping & Enameling; and J. B. Willis, Pemco.

Co.; and John C. Swartz, of Westinghouse Electric Corp.

The second symposium was on "Stresses and Strains in Enamel-Iron System." Panel members included: W. A. Deringer (leader), A. O. Smith Corp.; E. E. Bryant, Ferro Enamel Corp.; A. L. Friedberg, University of Illinois; and R. L. Fellows, Chicago Vitreous Enamel Product Co.

Thursday afternoon's session, presided over by Dana Chase, publisher of *finish*, included a discussion of

"Statistical Design of Experiments," by George Warren, PEI Research Fellow, National Bureau of Standards. This preceded the following talks on "New Product Development": "What the 'Curtain Wall' Can Mean to the Porcelain Enamel Industry," by Edward Mackasek, managing director, Porcelain Enamel Institute; "Development of the Harvestore," by W. G. Martin, A. O. Smith Corp.; "High Temperature Coatings," by Prof. D. G. Bennett, University of

Illinois; and "Observations on the Engineering Properties of Porcelain Enamel," by Forrest R. Nagley, Bureau of Ships, U. S. Navy.

Friday morning's session, presided over by R. F. Bisbee, Westinghouse Electric Corp., included the following talks: "Controlling Quality by Sampling Plans," by Walter F. Blickle, Altorfer Bros. Co.; "Safe Transit — A Vital Phase of Quality Control," by Paul W. Bush, Westinghouse Electric Corp.; and "Industry-Wide Research Program," by Prof. F. A. Petersen, University of Illinois. An adaptation of Prof. Petersen's talk appears in this issue of *finish*; also, another article in this issue, "What Happens to Your Products in Tran-



sit," contains part of Mr. Bush's talk which is the summary of a report prepared by the Sub-Committee of the Technical Planning Division of the National Safe Transit Committee. *(Additional selected papers will be adapted for finish and published in future issues.)*

Annual forum banquet

At the annual Forum banquet, held Thursday evening at the Urbana-Lincoln Hotel, Carlyle Emery, of Ruthrauff & Ryan (advertising agency), discussed "Action is Power." The speaker declared that while industry is doing an excellent production job, its "ability to sell has not kept up with (its) ability to produce."

"Board of Experts"

The closing session on Friday afternoon was devoted to a "question and answer" session with a Board of Experts, picked from men throughout the industry, answering questions directed at them by plant men attending the Forum. The questions were written out in advance, and were directed at specific members of the Board of Experts. Dr. G. H. McIntyre, of Ferro Enamel Corp., acted as moderator at this closing session.

Coordinating committee for enamellers clubs meets

The Coordinating Committee for the porcelain enamellers clubs met

Wednesday evening with the following in attendance: Eastern Enamellers Club — H. C. Ellinger (Philco) and G. H. Spencer-Strong (Pemco); Central District Enamellers Club — Jack Swartz (Westinghouse) and Mike Bozsini (Ferro); Midwest Enamellers Club — Rudyard Porter (Carnegie-Illinois Steel), Marcel Pouilly (DeVilbiss), Dana Chase (*finish*), W. K. Burris (Ceramic Industry), and W. J. Plankenhorn (U. of I.); Pacific Coast Enamellers Club — Hyman Leggett (California Metal Enameling); Porcelain Enamel Institute — John C. Oliver and George Warren; American Ceramic Society — Charles S. Pearce.

1950 PEI FORUM



HOMMEL'S TITANIUM FRIT Nos. 5166 and 5233

"TITE-WITE"

**CAN NOW BE USED WITH
COLORING OXIDES**

TO GIVE YOU

Pastel or Brilliant Colors

WITH

**COLOR
STABILITY**

**ACID
RESISTANCE**

**EXCELLENT
WORKING
CHARACTERISTICS**

**UNIFORM
OPACITY**

Plus

**ALL OTHER
ADVANTAGES OF A TITANIUM FRIT**

Yes! Now Hommel gives you a specially developed titanium frit—TITE-WITE—that can be successfully used with our coloring oxides to produce a variety of beautiful pastel or brilliant colors for all types of porcelain enameled ware.

This special line of "TITE-WITE" FRITS and coloring oxides—available in a wide firing range—has already been successfully accepted in the industry be-

cause they have *proved* to be outstanding in *color stability — acid resistance — uniform opacity and working characteristics*. You get these plus all the other advantages of a titanium frit in the production of your colored kitchenware, sanitary ware, stoves, and other porcelain enameled ware.

...
WRITE us. A Hommel Engineer is ready to help you.

THE O. HOMMEL CO. PITTSBURGH 30, PA.

Pacific Coast Agent L. H. BUTCHER CO.

POTTERY, STEEL AND CAST IRON FRIT
• CHEMICALS • SUPPLIES

Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems.

World's Most Complete Ceramic Supplier



NEWS

MORE BENDIX STOCK TO AVCO

Avco Manufacturing Corp., which acquired working control of Bendix Home Appliances, Inc. several months ago (July 1950 finish) with the purchase of 16% of Bendix stock, is now reported to hold ownership of more than 50% of outstanding Bendix stock. Victor Emmanuel, Avco's board chairman, pointed out that many Bendix stockholders exchanged their shares for Avco stock in the transaction.

JULY WASHER SALES 40%, IRONERS 42%, DRYERS 750% OVER JULY '49

Factory sales of household washers in July totalled 282,261 units compared to 325,217 in June, a drop of 13.2 per cent, according to industry-wide figures announced by the American Home Laundry Manufacturers Association. July washer sales were 40.5 per cent higher than 200,900 sold in the same month of 1949.

Dryers sold in July totalled 23,588 units, compared to 20,568 in June, an increase of 14.7 per cent, and were up 750 per cent over 2,775 in July, 1949. Ironer sales in July aggregated 25,100 units, down 7.4 per cent from 27,100 in June, and up 42 per cent over 17,700 in July a year ago.

PLUMBING, HEATING INDUSTRIES BUREAU MEETING, OCTOBER 5

The annual meeting of the Plumbing and Heating Industries Bureau will be held at the Palmer House, Chicago, Thursday, October 5, ac-

finish OCTOBER • 1950

ording to George O. Toepfer, president.

"The year 1950 has been an exceedingly active one for the Bureau," said Toepfer. "All members of the Bureau will be interested in the reports on our activities in 1950 which will be presented at the meeting."

GAS WATER HEATER SHIPMENTS HIT NEW PEAK FOR 7 MO. PERIOD

Industry shipments of automatic gas-fired water heaters during the first seven months of 1950 showed an increase of 62% over the same period last year, which is 14.6% greater than the unit shipments during the first seven months of 1947, the industry's peak year, according to a GAMA report.

Edward R. Martin, director of marketing statistics, Gas Appliance Manufacturers Association, stated that the total of 1,232,700 units shipped during this seven-month period was almost five times greater than the 1936-1940 average for the same months.

EASTERN ENAMELERS ANNOUNCE MEETING DATES

At a recent meeting of the board of directors of the Eastern Enamelers Club, the following dates were set for future meetings: November 18, February 17, and May 12.

The board unanimously recommended that the name of the organization be changed to the Eastern Enamelers Association in keeping

with the organizations purposes and standards of membership. Treasurer G. H. Spencer-Strong was appointed as a committee of one to rewrite the by-laws and constitution of the organization incorporating the new name.

Secretary Howard Williams was authorized by the board to contact Tom Fenton, of General Steel Wares, London, Ontario, offering the Canadian group assistance or guidance in the organization of Canadian Enamelers Clubs.

In attendance at the meeting of the board of directors were: President H. C. Ellinger, of Philco Corporation; Vice Pres. William Paul, of Harry Weiskettel Co.; Herbert Turk, of Pemco Corporation, Ex-Officio; and Treasurer G. H. Spencer-Strong and Secretary Howard Williams, both of Pemco.

APPLIANCE MFG. HEAD DIES

Vernon E. Dunn, 58, president of Appliance Manufacturing Co., Alliance, Ohio, manufacturers of household washers, died August 19.

He had been active in the washing machine industry through most of his life. He was with The Dexter Company, Fairfield, Iowa, for 26 years, leaving the treasurership of that firm in 1936 to become general manager of the newly organized Appliance concern. In November, 1942, Dunn was named president of Appliance.

PHILCO JOINS NEMA

Philco Corporation is reported to have joined the National Electrical Manufacturers Association. Philco, said to have been the only major producer of electrical appliances not associated with NEMA, will be affiliated with the major appliance division, the household refrigerator section, the farm and home freezer section, and the electric range section.

GIBSON SETS UP SEPARATE DIVISION FOR WAR PRODUCTS

Establishment of a separate war products division under the direction of Albert M. Gibson, as manager, has

been revealed by Charles J. Gibson, president of Gibson Refrigerator Co., Greenville, Mich. Utilization of one plant formerly used for warehousing is planned by the war products division.

It was stated that the move does not affect Gibson civilian production or ranges, refrigerators and freezers which will continue through the rest of 1950 at an all-time high.

G-E NOW 20% ON DEFENSE WORK

In the event of all-out mobilization, General Electric Company is in a position to produce substantially double what it produced during World

War II, Charles E. Wilson, company president, declared recently.

Wilson said that with its present expansion program completed and production currently at record-breaking levels, the company is far better prepared than at any other time in its peacetime history to meet demands made upon it by the Armed Services. He revealed that because of the current emergency, the company has accelerated its mobilization planning, an activity which was resumed shortly after the end of the last war. Wilson added that approximately 20 per cent of General Electric's current business is defense work.

WEST COAST REFRIGERATION AND AIR CONDITIONING SHOW AND RSES CONVENTION OPENS NOV. 16 IN LONG BEACH

California will beckon to refrigeration service engineers, dealers, contractors and wholesalers, November 17-19, when the 1950 West Coast Refrigeration and Air Conditioning Educational Exhibits and Conference is held at the Municipal Auditorium, Long Beach, California, in conjunction with the 13th annual RSES convention which opens on November 16.

The 3-day show is sponsored by the Refrigeration Equipment Manufacturers Association and the Refrigeration Service Engineers Society with the cooperation of the Refrigeration Equipment Wholesalers Association and the Refrigeration and Air Conditioning Contractors Association. The entire main floor of the Long Beach Municipal Auditorium will be used to house the educational exhibits of approximately 100 leading manufacturers.

Acting as hosts to the convention and educational conference are the California Association of RSES, the Long Beach Chapter of RSES, and the Long Beach RSES Ladies Auxiliary who are planning a very interesting program for the ladies.

The Educational Conference Committee of REMA is composed of F. G. Coggin, Detroit Lubricator, chairman; G. E. Graff, Ranco, Inc., vice chairman; H. T. Jarvis, Refrigeration Engineering, Inc.; J. H. Spence, Huss-

mann Refrigeration, Inc.; R. H. Israel, Virginia Smelting Company; and George E. Mills, REMA.

REPORT ON FREEZER SALES

Sales of electric farm and home freezers, by manufacturers reporting to the National Electrical Manufacturers Association, for the first six months of 1950 totalled 255,356 units. Unit sales for the month of June totalled 52,825 units.

SERVEL REPORTS GAIN FOR THIRD QUARTER

Net income of Servel, Inc., Evansville, Indiana, for the third quarter of 1950 amounted to \$779,395 or 42 cents per common share, it was announced by W. Paul Jones, president of the gas equipment and appliance manufacturing firm. This compares with earnings of \$733,620 or 39 cents per common share for the third quarter of 1949. Net profit for the nine months ended July 31 was \$902,169 after taxes, compared with a loss of \$565,800 for the same period last year.

In a statement accompanying the report, Jones said that refrigeration sales have recently been stimulated in some degree by war-induced buying. However, he added that Servel's

management believes such stimulus will be of short duration and is planning acceleration of an aggressive sales program. Opening of additional pipeline facilities for natural gas was also cited as a factor for future sales.

CHARLES WOODIN, APPLIANCE MFRS. CONSULTANT DIES

Charles K. Woodin, 62, of Chicago, for the past ten years consulting engineer to Chamberlain Corporation, Waterloo, Iowa, manufacturers of washer wringers, died August 13.

He served 15 years with Meadows Corporation (now a division of Thor Corp.), Bloomington, Ill., as vice president and general manager. Woodin also held the post of chief engineer of The Maytag Company, Newton, Iowa, for five years, and held the same post with the Norge Division of Borg-Warner Corporation for two years.

CANADIAN FIRM TO MAKE COOLERATOR REFRIGERATORS

The Coolerator Company has announced that final arrangements have been completed for the manufacture and sales of Coolerator refrigerators in Canada.

Ward R. Schafer, vice president and general manager, told Canadian distributors at a recent meeting in Duluth, Minn., that Coolerator had licensed E. Roy Co., Ltd., to manufacture refrigerators under Coolerator patents. It was stated that production is already in progress.

PLANT MAINTENANCE SHOW IN CLEVELAND, JANUARY 15-18

The Plant Maintenance Show, which drew industrial executives from 35 states and many foreign countries when it was conducted for the first time early this year, will be held again at the Auditorium in Cleveland, Ohio, January 15-18, it was announced by Clapp & Poliak, exposition management.

Present indications are that it will be two to three times the size of the initial show, it was stated. Already, 120 companies have leased booth

space which exceeds by 61% the total area used for the first show.

Also to be repeated will be the Plant Maintenance Conference which attracted approximately 1500 engineers and executives, one of the largest attendances recorded at technical sessions of this type.

"SPECIAL CONVENTION TRAIN" TO PAINT INDUSTRY MEETING

A "special convention train" will be run to San Francisco, Calif., where the 62nd annual convention of the National Paint, Varnish and Lacquer Association will be held from November 15 through 18.

Departing from Eastern and South-

ern cities on November 10, the "convention special" will assemble in Chicago on November 11, and arrive in San Francisco on November 14. Stops along the way will include Denver, the Royal Gorge, and Salt Lake City.

Following the Association meeting, the train will depart from San Francisco on November 19, arriving back in Chicago on November 28. Stops on the way back will include a 3-day visit in Los Angeles, sightseeing at the Grand Canyon, and Kansas City.

Reservations must be made before October 10, and can be placed only through John E. Smith, Jr., convention manager, U. S. Travel Agency, Inc., 807 15th Street, N. W., Washington 5, D. C.

HOMMEL ANNOUNCES NEW TITANIUM FRITS FOR COLOR

John Matejczyk, coordinator of research and manufacturing for The O. Hommel Company, has announced that his firm has developed a new line of titanium frits that can be successfully used with Hommel's special coloring oxides to obtain a beautiful variety of colors. The frits were developed to meet the rapidly increasing demands of consumers for brilliant, pleasing color in household appliances and kitchenware.

The colored finishes produced by Hommel's titanium enamels and special coloring oxides have been successfully used by enamelers and have established outstanding results in working characteristics, acid resistance, color stability and uniformity

of opacity, according to the report. A demand has existed for such frits and oxides and the many requests spurred the efforts of frit research departments. Previous attempts to accomplish these objectives have been largely defeated by wide variations in color under normal firing conditions. These variations do not occur with the new "Tite-Wite" frit and special oxides, it was stated.

These new titanium frits are being marketed under the trade name "Tite-Wite," a name which The O. Hommel Company has been using to distinguish its titanium based cover coat frits from other types of porcelain enamel frits.

point, Inc. The members will attend lunch as guests of J. J. Nance, Hotpoint president. Following the lunch, the enamelers will tour the range plant.

PAINT PRODUCTION CLUBS MEET IN CHICAGO, NOV. 9-11

The 28th annual meeting of the Federation of Paint and Varnish Production Clubs will be held in Chicago, November 9, 10 and 11, with headquarters at the Congress Hotel. The Paint Industries Show will open Thursday morning, November 9, and

close on Saturday, November 11. The Council meeting will be held on Wednesday.

SUNRAY RETAINS DESIGNERS OF 1951 RANGE LINE

After having completed the new line of 1951 ranges for The Sunray Stove Company, Delaware, Ohio, Smith & Scherr, design associates of Akron, Ohio, have been retained by Sunray to continue the design development on future models, according to an announcement.

ARMCO EXPANDS FACILITIES AT ZANESVILLE PLANT

Charles R. Hook, chairman of Armco Steel Corporation, has announced that the company is spending approximately \$1,500,000 to modernize and expand its Zanesville, Ohio, plant. Engineers have finished the plans and construction work, already started, will be completed within the year.

"This construction program will increase considerably the capacity of our Zanesville plant," Hook declared. "Expansion is necessary because the demand for Armco electrical steel made at Zanesville has been more than the plant can produce."

WEST COAST STEEL PLANTS EXPANDING

Columbia Steel Company has decided to increase substantially the steel-finishing facilities of its Pittsburgh, California, plant, it was announced by Alden G. Roach, president of this west coast subsidiary of United States Steel. Additional cold reduced sheet and tin plate facilities will be installed at Pittsburgh, with an annual capacity of approximately 215,000 net tons of sheets and tin plate. Work on the new facilities will be started as soon as possible, and it is expected that the new mill can be put in operation by late summer in 1951.

Concurrently with this announcement, Geneva Steel Company, another U. S. Steel subsidiary, is announcing the installation of an addi-

WEST COAST ENAMELERS MEETING

The next meeting of the Pacific Coast Enamelers Club will be held in Los Angeles, on October 6, it was announced at the meeting of the Coordinating Committee for Enamelers Clubs held during the recent PEI Forum at the University of Illinois.

MIDWEST ENAMELERS TO TOUR HOTPOINT'S RANGE PLANT

The Midwest Enamelers Club's next meeting will be held Oct. 13, in Chicago, at the new range plant of Hot-

tional 100,000 net tons of hot rolled steel sheets annually. When these two programs are completed, Columbia Steel and Geneva Steel will then have a combined annual capacity for the production of approximately 640,000 tons of sheet and tin plate products.

The present cold reduction sheet and tin plate mill at Pittsburg, which was placed in operation two years ago, will be enlarged considerably to house the new equipment, which will

include a continuous pickler; a four-stand cold reduction mill for cold rolling steel up to 54 inches in width; an electrolytic cleaning line; an electrolytic tinning line; four additional coil annealing furnaces; a side trim and recoil line; and a continuous sheet galvanizer. The last is a recent development in the steel industry and will mark the first time such equipment has been installed in the west.

PENNSALT CELEBRATES 100TH ANNIVERSARY



Pennsalt's Whitemarsh Research Laboratories at Chestnut Hill.

Pennsylvania Salt Manufacturing Company celebrated its 100th anniversary during the last week of September with a series of events commemorating this milestone at the company's Whitemarsh Research Laboratories, at Chestnut Hill, near Philadelphia.

The company was founded by five

young Philadelphia Quakers who sought to manufacture "the alkaline salts of soda." They raised some \$100,000 in capital and secured a plant site over salt deposits near Pittsburgh. Today, their company is one of America's leading basic chemical manufacturers, producing at its century mark at the rate of \$38,000,000

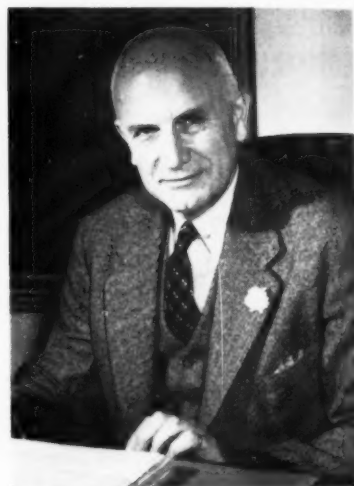
Joseph J. Duffy, Jr., left, sales manager, special chemicals department, is shown with Wm. P. Drake, vice president in charge of sales.



worth of products a year for nearly every industry in the country.

An active diversification program was begun in 1928 when Leonard T. Beale, then president (now chairman of the board), called for a program seeking new products for more fields. One result of this research program was the production in 1935 of anhydrous sodium orthosilicate as a metal cleaner.

A sales department for Pennsalt metal cleaners was formed in 1939. Among company personnel actively interested in the cleaners program during the 30's were George B. Beitzel, then sales manager (now president); William P. Drake, now sales



GEORGE BEITZEL

vice president; and Joseph J. Duffy, Jr., now manager of the special chemicals department.

Today, Pennsalt's special chemicals department handles more than 50 chemical specialties for the metal industry, including: acid, alkaline and emulsion type cleaners; rust inhibitors; pickling and descaling compounds; maintenance cleaners; and corrosion resistant cements and paints.

Pennsalt is a basic producer of chlorine, caustic soda, hydrofluoric acid, sal ammoniac, refined cryolite, chlorates, ammonia, muriatic, nitric and sulfuric acids, hydrogen peroxide and other heavy chemicals.

ATLAS MINERAL APPT.

The appointment of Dr. Robert H. Steiner as research coordinator for

A Sunray "must" feature... PERMA-VIEW

Here's what George E. Mumma, President of The Sunray Stove Co., Delaware, Ohio, says:

"As we designed our 1951 line . . . we felt that one feature that must be included in as many models as possible, was your 'Perma-View' prefabricated oven door window.

"Because of the easy assembly, reduction in the number of purchase parts, and the resultant competitive price, you will be glad to know that we have included your window in every model retailing for over \$100.00.

"I am sure this will result in a substantial volume of sales but we have confidence in your ability to serve us as a result of our very favorable experience with your company during the past two years."

The demand for PERMA-VIEW continues to increase as more and more range manufacturers discover its strong appeal on the sales floor and in the home.

Our engineering department will show you how easily PERMA-VIEW can be adapted to your range. Just indicate your interest by letter or phone.

"OUT OF OUR CARTON—INTO YOUR DOOR"
It's as simple as that!



MILLS ENGINEERING COMPANY

3683 EAST WILLIS DETROIT-7-MICHIGAN

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Atlas Mineral Products Company has been announced by George L. Wirtz, president. Steiner was associated with The Firestone Tire and Rubber Co. for the past seven years.

CARBORUNDUM APPTS. AND PERSONNEL CHANGES

Sales assignments announced by The Carborundum Company include the appointments of John A. Decker as sales manager for the New York

district, and William J. Kingsley as assistant sales manager of the Bonded Products and Grain Division, with headquarters in Niagara Falls, N. Y.

Other changes include the transfer of Thomas Curtiss, a field sales representative in the Buffalo area, to the central New York area. Edgar T. Harris will fill the Buffalo vacancy. George Dennison was named a special sales engineering representative for the state of New York, with headquarters in the Buffalo district office.

AGA AND WESTERN STOVE CITE ZEKE MANNERS



Photo shows the presentation of an Award to Zeke Manners on his Pacific Coast network show by Western Stove Company, Inc., of Culver City, Calif., and the American Gas Association "in recognition of his outstanding success in the promotion and sales of Western-Holly "CP" gas ranges."

Left to right: Charles W. Person, AGA advertising director; Zeke Manners, of ABC's Pacific Coast network and WJZ-TV; John F. Brembeck, Western Stove advertising manager;

and Ed Westland, eastern distribution manager, Western Stove.

The Award was signed by both Henry Honer, president of Western Stove, and Hugh Cuthrell, president of American Gas Association.

Western-Holly gas ranges, with recently established distribution outlets throughout the country, are now on an allocation basis to assure each dealer his "proportionate share of the ranges produced."

NEW HOOKER-DETREX TRICHLOROETHYLENE PLANT



Completion of a large modern trichlorethylene manufacturing plant at Ashtabula, Ohio, has been announced by Hooker-Detrex, Inc.

The full production capacity of the new plant will be utilized in the manu-

facture of metal degreasing solvents for Detrex Corporation. It is expected that production capacity will be reached by November 1.

Works manager of the Ashtabula plant is H. D. McKinley, formerly

manager of the solvents division of Detrex, who also collaborated in the design and initial operation of the Hooker-Detrex solvent manufacturing plant at Tacoma, Wash., several years ago. The manufacturing operations of both the Ashtabula and Tacoma plants are supervised by Hooker Electrochemical Co.

CHEMICAL, PIGMENT DIVISION APPTS. AT GLIDDEN

John P. Ruth, vice president in charge of the Chemical and Pigment Division of The Glidden Company, Baltimore, has announced the elevation of four major executives.

G. M. Halsey, manager of the Baltimore plant, has been named to a newly-created post of director of manufacturing for the entire division. He is succeeded by James W. Pollard, Jr., an authority on titanium dioxide production, and formerly plant engineer. A. J. Benjamin was advanced to the position of assistant manager, and Irving J. Foote was named plant engineer.

COOLERATOR POSTPONES PLANS FOR '51 APPLIANCE MODELS

In view of the unsettled Korean situation and current market conditions, The Coolerator Company has postponed introduction of 1951 models planned for this fall, according to W. C. Conley, Jr., general sales manager.

Pointing out that their stocks of refrigerators, ranges, and freezers and current production is completely sold out, Conley stated that Coolerator decided to continue manufacture of the current lines rather than shut down the plants for a change-over at this time. Allocation of merchandise to distributors was begun September 1, according to Conley.

FOOTE MINERAL RESEARCH STAFF ADDITIONS

Dr. Holger C. Anderson, formerly research and development director, Hastings & Co., and Lawrence J. Reader, formerly senior inorganic re-

search chemist with General Chemical Co. and Wyandotte Chemical Corp., have joined the staff of the Foote Mineral Company Research Laboratories, according to Dr. S. C. Ogburn, Jr., director.

500 GUNNISON HOMES FOR LOUISVILLE

Negotiations have been completed for the erection of 500 Gunnison homes for suburban Louisville, Ky. The homes will be factory built by Gunnison Homes, Inc., prefabricated housing subsidiary of United States Steel.

Gen. John J. O'Brien, president of Gunnison Homes, said the prefabricated housing company is producing at the rate of 185 dwellings weekly.

NEW WHITING SALES POLICY

Whiting Corporation, for over 60 years a leading producer of industrial



STEVENS HAMMOND

equipment and machinery, has announced a new distributing policy for its merchandise sales division, according to Stevens H. Hammond, president. He stated that during the past year the division's line of materials handling equipment has been completely reorganized and expanded to include electric chain hoists, package and bulk material conveyor systems, overhead monorail and light crane systems and hoist-type cranes.

Twelve sales territories are said to have been organized and manned, and

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use an
**INDUSTRIAL
Filter**

100 to 15,000 gallons per hour.
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Standard or special filtration
systems engineered to meet
unusual requirements.

**Dependable
clarification pays . . .**



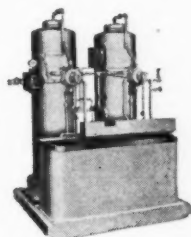
Here's how Industrial filters simplify clarification problems—The flow rates of Industrial filters are based on the actual solution involved. You know the capacity you get. In solution clarification there is more than just the filter. With Industrial you get an adequate filter with slurry tank, motor-driven pump, valves and fittings in a complete package with one, undivided, experienced responsibility—with space requirements at a minimum.

The labor, down time, and the inconveniences of cleaning, replacing the filter media, and reassembling the filter for every new filter cycle—all are eliminated by the Industrial Air-Wash Cleaning Method available for all models. It is necessary to remove the cover only when new filter cloths are installed. With Industrial filters, a clarified plating solution is always assured.

The engineering, design, and construction of Industrial filters have proved out in long service and low maintenance costs. Industrial has the experience and is large enough to handle your filter requirements. Since 1927 filters and filtration systems have been an important part of our business.

INDUSTRIAL Water Demineralizers

for Mill room assurance
that the slip is
always right



A Two-Bed INDUSTRIAL Water Demineralizer.
Standard two-and four-bed units available with
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Write for full information
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| RUBBER DIVISION | | WATER |
| Vulcanized Linings • Molded Products | | DEMINERALIZERS |

materials handling equipment distributors are being appointed. The firm's line of rotary shears and stamping

trimmers will continue to be distributed through selected machinery dealers, it was stated.

GAS INDUSTRY'S "LARGEST EXPOSITION", OCTOBER 2-6

Many new and improved types of gas appliances and equipment will be shown for the first time during the biennial exposition of the Gas Appliance Manufacturers Association to be held in Atlantic City, from October 2 through 6. The exposition is being held in conjunction with the 32nd

annual convention of the American Gas Association. Some ten thousand visitors are expected, including many gas utility and liquefied petroleum gas industry personnel.

It is estimated that approximately 1200 new and improved products ranging from clothes dryers and

ranges, to large gas-fired boilers, and single unit heating-cooling devices, will be displayed at the 5-day show. Exhibits by 175 manufacturers will cover 70,000 square feet of floor space, making this the "largest exposition" ever conducted by the gas industry, according to H. Leigh Whitelaw, managing director of the Gas Appliance Manufacturers Association.

PRIZER-PAINTER BUYS RENOWN AND KEELEY STOVE LINES

Sale of Renown Stove Company's combination range business to The Prizer-Painter Stove Works, of Reading, Pa., has been announced by B. A. Nagelvoort, president of Renown.

The sale gives Prizer-Painter the right to the use of the name Renown for dual-oven combination ranges, bungalow ranges, and coal and wood ranges, and includes the goodwill developed by Renown in the range business over the years. (The company started in business in 1906.)

An announcement also comes to *finish* from Leonard E. Bilger, president of Prizer-Painter, that his company also "purchased at The Keeley Stove Company sale all of the patterns, dies, and the A.G.A. approval and the Keeley or Columbian name on the #636 gas range line." Prizer-Painter also "purchased all of the inventory to manufacture this range along with all of the purchased inventory for their other ranges."

It was added, however, that T. S. Lockard, formerly general manager of Keeley, purchased "the coal and the combination patterns and dies" of the Keeley line.

RESISTANCE WELDING CONTEST WINNERS ANNOUNCED

The Resistance Welding Institute has announced the winners in the RWMA 1950 Prize Contest as follows:

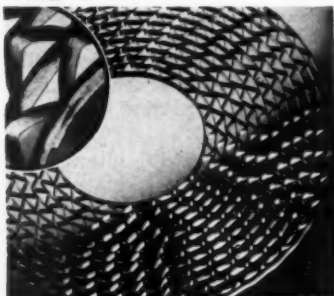
Category No. 1 — Papers emanating from an industrial source: 1st prize, \$750, to paper on "A Practical Method for Obtaining Consistent Resistance Welds," by J. W. Kehoe, Westinghouse Electric Corp., Pittsburgh, Pa.; 2nd prize, \$500, to paper on "Stress Distribution Around Spot Welds," by A. O. Bergholm, P. W.



TAKE THE PRAYING OUT OF SPRAYING!

Get a consistently fine iron-free finish with **FRANTZ Permanent Magnet FERROFILTERS**

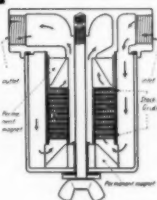
REMOVE iron at the last possible moment from your enamel, and from the compressed air by installing Permanent Magnet **FERROFILTERS**. Put one of these compact, inexpensive units between the enamel tank and the gun hose, and another on the air line at the booth, and see how rejections and reworks caused by iron spots go down, and profits go up.



A **FERROFILTER** GRID magnified inset shows collected particles on grid edges.

FRANTZ FERROFILTER

- Catches ferrous particles as fine as one micron
- No replacement parts to buy
- Full flow and non-clogging
- Easily attached
- All parts easily accessible and quickly cleaned



Think of what this can mean in clean, bright finishes and economical operation!

FRANTZ FERROFILTERS are in successful use in hundreds of Ceramic plants throughout the world. They are doing their job and doing it well in small plants, in large plants, and in great plants.

Write us for complete information today!

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CHICAGO VITREOUS ENAMEL PRODUCT CO.
1425 So. 55th Court Cicero 50, Ill.

Swartz and G. S. Hoell, The Franklin Institute, Philadelphia; 3rd prize, \$250, to paper on "Variables in Cross-Wire Welding of Dissimilar Metals," by I. S. Goodman, Westinghouse Lamp Division, Bloomfield, N. J.

Category No. 2—Papers emanating from a University source, the author of which is either an instructor, graduate student or research fellow: 1st prize, \$300, to paper on "Fatigue Tests of Spot-Welded Steel Sheets," by Dr. Georges Welter, Ecole Polytechnique, Montreal, Canada; 2nd prize, \$200, to paper on "Electrical Resistance Offered to Non-Uniform Current Flow," by W. B. Kouwenhoven and W. T. Sackett, Jr., Johns Hopkins University, Baltimore, Md.

DETROIT STEEL PLANS

NEW MILL AT PORTSMOUTH

A long range expansion program for the Portsmouth (Ohio) Division of Detroit Steel Corporation has been revealed by Max J. Zivian, president. The program may ultimately double production in the Portsmouth mill, he indicated.

The largest item will be a new cold rolled continuous sheet mill which will replace the present semi-automatic sheet mill. The new mill will work in conjunction with a new hot rolled continuous strip mill which already is under construction in the 10 million dollar program announced last January.

INDUSTRIAL WASTE DISPOSAL

CONTROL PAYING DIVIDENDS

Big dividends are already being harvested by industry and the public in an expanding program to control the disposal of industrial wastes, it is reported.

"The public can count its gains in terms of wild life conservation, and industry in the recapture and use of wastes which, once considered useless, polluted streams," said Louis Gess, chief processing application engineer for Minneapolis-Honeywell Regulator Co. Gess will discuss industrial waste disposal at a symposium to be held by the Philadelphia Section of the Instrument Society of

America, on November 2. The subject of the meeting, to be held at the Hotel Bellevue-Stratford, will be "Industrial Waste Disposal—A Problem for Instrumentation."

HERMAN COOK REJOINS NORGE

Announcement comes from H. L. Spencer, vice president in charge of manufacturing, Norge Division of Borg-Warner Corp., that Herman Cook has returned to the Norge Muskegon Heights (Michigan) plant where he will have complete charge

of all porcelain enameling operations and development of new techniques in porcelain enameling.

He will also be a consultant to the other Norge division plants, the range plant at Effingham, Illinois, and the washing machine plant at Herrin, Illinois, stated Spencer. Cook had charge of enameling operations for nine years at Norge before leaving the company ten years ago. His most recent connection was with the Association of American Railroads as ceramic engineer.

IT'S NEW — — a low cost Collapsible Pallet Box

Here's a brand new money saver for in-plant storage and handling of materials, loose bulk or packaged, and for outside shipments too. Its low initial cost will save thousands of dollars for plants using pallets in quantity.

The new B-G Wooden Collapsible Pallet Box is light in weight but built strongly enough to handle weights up to 3000 lbs. and more, and is sturdy enough to stand up under many repeated shipments.

The collapsible feature is made possible by the exclusive Bigelow-Garvey TIGHT CORNER hinge design used on all of our collapsible wood shipping crates.

Used as a storage box, a tote box or as a shipping container, you will like this sturdy but inexpensive addition to effective materials handling.



Above: Photo shows how pallet box is easily attached to any standard pallet by means of 4 flanged corner irons (furnished by us) and a single steel strap, either flat or round.



Right: Photo shows hinged box collapsed for storage or return shipment. Tops can be furnished if desired.

FOR COMPLETE DETAILS AND PRICES WRITE

BIGELOW-GARVEY LUMBER CO.

General Office and Laboratory

320 West Huron Street • Chicago 10, Ill.

Mills: Arkansas • Georgia • Wisconsin • Minnesota • Illinois

HONORARY DEGREE TO HOOK

The honorary degree of Doctor of Humanities was awarded September 4 to Charles R. Hook, chairman of the board, Armco Steel Corporation, by Muskingum College, Zanesville, Ohio.

In making the presentation, Dr. Robert Montgomery, president of the college, said, "Muskingum College is happy to confer the honorary degree of Doctor of Humanities upon Mr. Charles R. Hook because we believe the ideals he has fostered in his cor-

poration and business dealings have much in common with the Christian ideals of Muskingum College . . . The interest that Mr. Hook has evidenced in the welfare of his employees and in the betterment of mankind generally mark him as a great humanitarian."

The degree was conferred upon Mr. Hook in Zanesville, where some 20,000 Armco families and their friends met to observe the 50th anniversary of the founding of Armco.

PEMCO EXPANDING PLANT FACILITIES

Pemco Corporation, Baltimore, Md., manufacturer of porcelain enamel finishes, colors, ceramic glazes, glass colors, and ceramic chemicals, is expanding its plant facilities to meet the increased demand for its products, according to an announcement by Richard H. Turk, president of Pemco.

"This expansion, involving the expenditure of approximately a quarter

of a million dollars and adding more than 30,000 square feet of floor space to existing facilities, comes at a time when Pemco's production is at a higher level than it has ever been in the 40 years' history of the company," said Turk.

All construction will be of fire-proof materials, chiefly brick and steel, and will be of daylight design. Modern loading docks for railroad

and truck transportation are a part of the project.

Contracts for the work involved have been awarded to Consolidated Engineering Company, Inc., and the entire program is expected to be complete by November 1.

NEW PLANT FOR STREET LIGHTING MATERIALS FIRM

A new plant building for the manufacture of aluminum pole line hardware, specialties, and street lighting materials will be completed by September 1 at a cost of over \$150,000 for Hubbard and Company, Pittsburgh, according to The Rust Engineering Company, design-constructor.

NEW WAREHOUSE FOR FLAT ROLLED METAL PRODUCTS

Opening of The Kenilworth Steel Company, Kenilworth, N. J., in a new plant, launches for the metropolitan New York, Eastern and New England States regions a specialized

It's MISCO for HEAT RESISTING ALLOYS IN ROLLED MILL FORMS

If You Use or Need HEAT RESISTING ALLOYS Send For Our MONTHLY STOCK LIST

We Have Over 200 Items of Heat Resisting Alloy Mill Forms in Warehouse Stocks Ready for You

WE SPECIALIZE IN A.I.S.I. TYPES 330, 310, 309, 430

ROLLED PRODUCTS DIVISION
Michigan Steel Casting Company
1595 GUGUIN ST. DETROIT 7, MICH.

MISCO
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

National Metal Exposition and Congress in Chicago, October 23 through 27

The 32nd National Metal Congress and Exposition will be held in Chicago at the International Amphitheatre, October 23 through 27, under the sponsorship of the following: American Society for Metals, American Welding Society, Metals Institute Division of American Institute of Mining and Metallurgical Engineers, and Society for Non-Destructive Testing.

Theme of the meeting will be "Materials and Equipment for High Production." The purpose of the event is to bring together the metalworking industry's fullest knowledge of materials, processes and equipment—through demonstration, conference, forum, lecture and clinic; to evaluate this knowledge on the basis of its most effective use with materials, plants and equipment in the economy of unit costs and in securing of high productivity from all facilities.

Approximately 350 nationally known firms engaged in either the production of metals, the treatment of metals, their fabrication or in furnishing services to all these, will exhibit their products, equipment or services in the International Amphitheatre.

steel warehouse service. Products to be stocked initially are entirely in the flat rolled metal category in gauges .001 up to .187.

PEI ANNUAL MEETING, NOV. 1-2

The 19th annual meeting of the Porcelain Enamel Institute will be held at The Greenbrier Hotel, White Sulphur Springs, W. Va., November 1 and 2.

HARBISON-WALKER EXPANDING

Harbison-Walker Refractories Co., Pittsburgh, has announced the purchase of approximately 45 acres of land at Windham, Portage County, Ohio, for the erection of a refractories plant to produce silica refractories. The plant is designed for a starting capacity of approximately 20,000,000 nine-inch brick equivalents annually. It is contemplated that the first unit will be in operation within one year.

PENNSALT MAN HEADS DETROIT MATERIALS HANDLING GROUP

F. A. Dahlquist, of Pennsylvania Salt Manufacturing Co., has been elected president of the Detroit Chapter of the American Materials Handling Society for 1950-51.

The Suggestion Box

→ from Page 11

quite similar to the one used for brazing. The work travels along under the Gun, on the conveyor system, at a speed that synchronizes with the correct amount of solder which is allowed to drip into the seam to give a perfect solder job. The object to be soldered is placed on the conveyor in such a position that the seam is at the highest point so gravity and capillary action can be utilized in filling the seam. A speed of 50 lineal feet of soldered seam per minute is easily attainable with an efficient conveyor.

With the soldering installation, foreburners and afterburners are used to heat the work sufficiently so the solder will flow. The tube which guides the wire solder is set at an angle of 45 degrees to the work so the flame does not strike directly on

the surface as in brazing. This is principally because of the thin sections found in cans or other articles which would adapt themselves to this type of high speed production soldering.

For lead base soldering, natural gas at low pressures is entirely satisfactory, and any of the lead tin alloys in wire from 1/16" to 3/16" diameter can be used for this kind of work.

There are several advantages in connection with this method of pro-

duction soldering. It is much faster, makes a cleaner and better looking job, the solder is applied only to the immediate area of the seam, and there is a saving of solder which, in some cases, amounts to as much as 75%. In fact, the soldering is so rapid, that the full capacity of the Gun cannot always be utilized and it is often necessary to slow it down to correspond with conventional conveyor and manufacturing speeds.

WEYERHAEUSER CRATES



Bundled for palletized loading

● To simplify handling and reduce storage costs, Weyerhaeuser crates are furnished in sections. From 40 to 50 crate sections can be metal-strapped together and palletized for truck handling. Palletized handling reduces unloading, and storage costs. It also makes the crate sections readily accessible. Weyerhaeuser Crates are also available in one-man bundles.

Weyerhaeuser-designed crates utilize hardwoods and soft hardwoods where each serves best... thereby securing a product of adequate strength

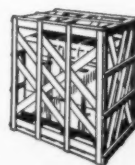
that can be assembled without splitting or costly pre-drilling.

Diagonal bracing gives these crates 65% more strength than ordinary strut crates. Nailing at corners combines secure joining with maximum rigidity. The open design allows inspection of the product in transit without the expense of uncrating.

Weyerhaeuser offers a complete engineering service, backed by 18 years of experience in designing and building sectional crates... for complete information, write or phone.

WEYERHAEUSER SALES COMPANY

INDUSTRIAL WOOD PARTS DEPARTMENT
Room 2134 • 400 West Madison, Chicago, Illinois





You'll be amazed at the

*Changes that demand your
attention are continually
in the making.*

P
B

maximize the potentials of MODERN PORCELAIN ENAMELS!

Factual evidence of what has been accomplished by research and production in laboratory and field give authority to this statement "You'll be amazed at the potentials of MODERN PORCELAIN ENAMELS." For each of the accepted uses there is in the making NOW a new field of uses equally as important equally as broad in scope and certainly suggesting a healthy future for the World's Finest Finishes—MODERN PORCELAIN ENAMELS!

How to adapt this FINISH to your production will be cheerfully explained and demonstrated to you by a Pemco FIELD ENGINEER! Today the leading minds in the industry are fanning out in NEW Fields of Porcelain Enamel Finishes with the force of a conviction that is bound to produce results. Changes that demand your attention are continually in the making.

. . . and Pemco is ever ready to place at your disposal the knowledge and experience gained through 40 years of leadership in producing THE WORLD'S FINEST PORCELAIN ENAMELS. INVESTIGATE MODERN PORCELAIN ENAMEL FINISHES. Write—wire or phone Pemco today.

PEMCO CORPORATION

Baltimore 24,  Maryland

Always Begin With a Good Finish

New Supplies and Equipment

J-11. Dispenser for filament tapes



A new hand dispenser for dispensing lengths of tough tear-resistant filament tapes is announced. The new all-metal unit is designed for use with filament and other hard-to-cut tapes. It can be used with tape rolls up to 72 yards in length, and accommodates tape widths from $\frac{1}{2}$ to 1 inch.

Main feature of the new dispenser is a razor-sharp cutting edge. A thumb-operated trigger presses the cutting blade against the tape to make the cut. When the trigger is released the blade retracts so that it cannot cut accidentally.

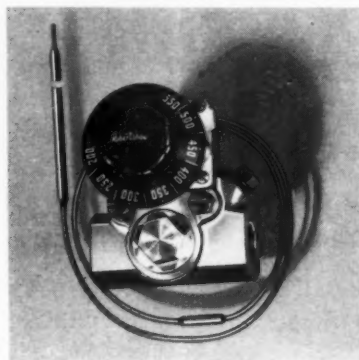
J-12. Hydraulic control for cooking

A new hydraulic throttling type control for commercial cooking equip-

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form on this page.

ment has been announced. It embodies a standard type diastat, has fast opening feature when set at top of temperature ranges, has large



capacity for its size, is compensated for ambient temperature up to 350° , and is available only with high temperature equipment diastat. The diastat can be removed and replaced without disconnecting body.

J-13. A new "dissolver"

A new dissolver, which works batches of 5 to 100 gallons of material ranging in viscosity from 1 to 30,000 centipoises, is announced.

The entire motor, bridge, and dissolver unit may be adjusted in

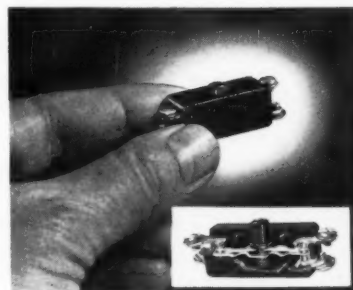
height through a range of 11 inches by means of an elevating screw. The bridge support can be tilted through an angle of 60 degrees for quick removal of the impeller from tanks.

A five horsepower, explosion-proof motor is on the bridge. The drive



assembly is mounted on a slide plate to permit horizontal movement. Affords a wide selection of sheave ratios and speeds, and the use of selected groups of impellers which are supplied with the unit.

J-14. Small snap-action switches



An expanded line of small size, precision, snap-action electrical switches for industrial use is offered. These are said to be a development of high-accuracy aircraft switches.

Snap-action of contacts is extremely rapid, arcing is greatly reduced and there is no dead center position. Switching action, it is said, is independent of the speed of the actuator. Features emphasized are the small size, compact design and light weight.

In use unit is often enclosed in a protective metal housing. Special housings available for general-purpose, enclosed and splash-proof switches.

Switch for general purpose applica-

FINISH

360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No. _____ No. _____ No. _____ No. _____

No. _____ No. _____ No. _____ No. _____

Name _____ Title _____

Company _____

Company Address _____

City _____ Zone _____ State _____

tions (inset on photo) may be wired for normally-open or normally-closed operation by using only two terminals.

J-15. Compact bench model grinder for light work



Free-hand grinding of castings, forgings, stampings, plastics, etc., where little stock removal is required, represents an important need in industry, for which this small, inexpensive bench model grinder was designed.

This new vertical spindle grinder has an approximate weight of only 575 pounds, complete with its 18" diameter abrasive wheel. It is 31" high and 28½" wide overall.

As all grinding is done in the horizontal plane, easier handling is claimed as well as increased production and safer operation. Crossarm, pedestal, motor-driven coolant pump, tank, and piping for wet grinding are included in optional equipment.

J-16. New fastener for electrical insulation and shock resistance



This new insulating screw is said to be comparable in strength and accuracy to a standard metal screw, and yet has the additional advantages of electrical insulation, shock resistance, and vibration damping. It has been used in the manu-

facture of electrical components, in the chemical process industry, and in the design of mechanical assemblies.

Basically, the new fastener consists of a serrated metal core which has been extrusion-coated with a thermoplastic material. After the extrusion process the resulting com-

posite rod is cut in an automatic screw machine. The metal core runs the entire length of the screw and furnishes most of the screw strength. The plastic exterior gives the new screw its insulating and sealing qualities. The metal core carries the torque applied by a screw driver or other driving instrument.

J-17. Taper attachment for tool room lathes

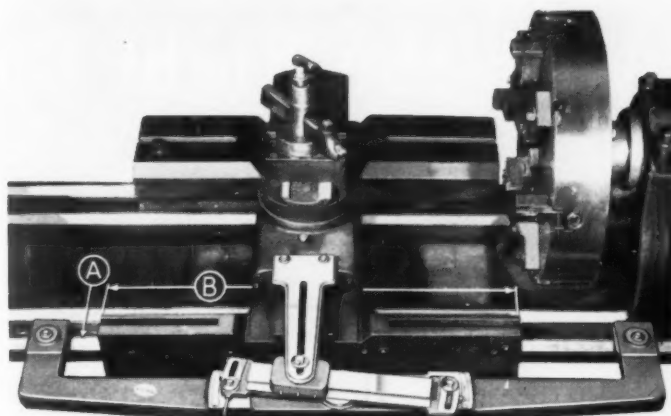


Photo shows actual installation of taper attachment, with V-ways at A and 36" at B. This new attachment can be mounted on all makes of new and old engine and tool room lathes in a few minutes. Built for extra-heavy duty, it's suitable for lathes with swing up to 36" to cut a taper

of 20° or 4" per foot and 12" longitudinally at one setting. Features include long bearing surface with gibs to compensate for continuous use, and a swivel bar with V-ways graduated at the ends in degrees and inches.

J-18. New haulage vehicles for bulk materials



Increased speed, reduced size and greater stability are three of many new features of a redesigned line of haulage vehicles for bulk materials.

A new two-speed transmission per-

mits 14 m.p.h. travel in high gear and 8 m.p.h. in low gear, in both forward and reverse. Can be operated with ease, indoors and out, and even through narrow factory aisles.

**PROTECT THOSE VALUABLE
FINISHED PRODUCTS
With the Right Box or Crate**



**NAILED OR HINGED CORNER
PLYWOOD CRAVENEER WIREBOUND
CLEATED CORRUGATED
BOXES OR CRATES**



Consult with our packing engineers on product protection — Our designing and testing laboratory is at your service, without obligation.

CHICAGO MILL AND LUMBER COMPANY

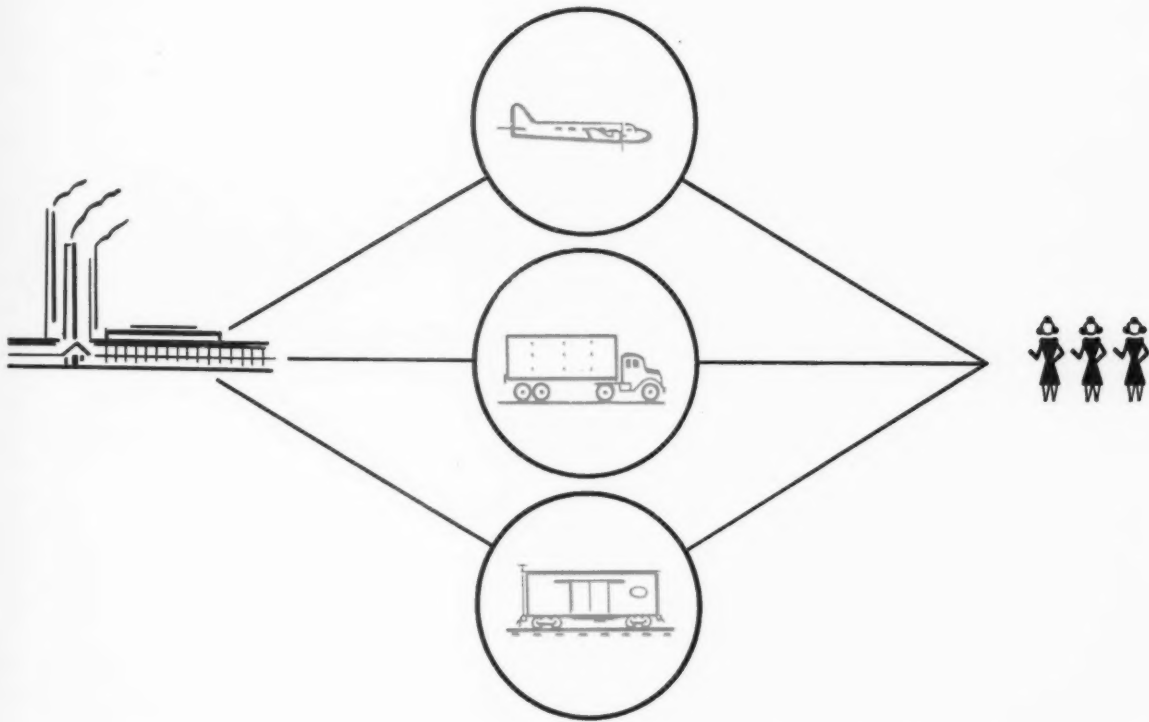
33 South Clark Street

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Plants at: Helena, Ark. • Greenville, Miss. • Tallulah, La. • Rockmart, Ga. • Chicago, Ill.

Safe Transit...

from assembly line to final customer



A monthly feature including:

Testing Information
N.S.T. Committee Reports
Packaging News
Case Histories

PRE-TESTED SAFE TRANSIT SHIPMENT

This PACKAGED PRODUCT meets the pre-testing standards established by the National Safe Transit Committee and will withstand ORDINARY transportation and handling hazards.

NATIONAL
SAFE TRANSIT
COMMITTEE



1010 VERMONT AVE. N. W.
WASHINGTON 5
D. C.
©

**MAKE
SAFE HANDLING
YOUR JOB !**

Over-packaging is expensive

IN the manufacture of home appliances and other finished metal products over-packaging is a common practice and crating and packing techniques and materials are practical and reasonable targets for wise cost-cutting. Until recently, however, there was no good way for the shipper to determine whether or not he was over-packaging. The chief

indicators of packaging effectiveness were scattered field reports and records of damage claims—the kind of information that is helpful much too late, if at all.

Dependable measure of shipability

With the development of the National Safe Transit Program, the shipper is now provided with a de-

pendable tool with which to measure the merits of his Packaged-Product unit in terms of shipability. Following the Safe Transit pre-shipment testing procedure, the manufacturer

FIBER-and-STEEL STRAP CUSHIONS AS IT BINDS



For Internal Bracing

•
Prevents Shipping Damage

•
Cuts Shipping Costs

FIBER-and-STEEL is steel strap with a cushion of protective Kraft paper around it. You can apply FIBER-and-STEEL directly on the enameled surfaces of stoves, refrigerators and other similar products with *no cushioning needed* between the product and the strap. The outer layers of Kraft paper protect the surface. The inner layer of steel strap binds with a slip-proof grip.

FIBER-and-STEEL saves time and materials in packing, makes uncrating easy, and leaves no adhesive stains. It is secured with a soft aluminum Gerrard seal.

WRITE OR WIRE TODAY
FOR A TEST DEMONSTRATION
IN YOUR PLANT



A. J. Gerrard & Co.

1958 Hawthorne Place, Melrose Park, Ill.
(Chicago Suburb)



Strap calculator. Write for your free copy.

FIFTH ANNUAL

**INDUSTRIAL
PACKAGING
& MATERIALS
HANDLING**

Exposition

CONVENTION HALL

PHILADELPHIA

OCT. 10-11-12, 1950

may find a structural weakness in his product, in his package, or both. He may find that he has been over-packaging in order to compensate for such a weakness, or to compensate for unnecessarily rough handling on certain carrier lines. He may simply find that he has been over-estimating the packaging materials necessary to protect his product in-transit, and can immediately reduce the amount of those materials.

Tests make one firm

re-examine packaging practices

W. H. Allman, works staff manager, The Republic Stamping & Enameling Co., says, "Like others in this industry, we have felt for some time that we knew a good deal about packaging enamelware. The immediate effect of the Safe Transit Program was to get us to re-examine our ideas and practices about packaging. To tell you the truth, we have been very much surprised in what we have seen in these tests.

"We know now, for instance, that internal packing is in many cases more important than external packing. We know also that the more expensive carton is not necessarily the better carton and we have been pleasantly surprised at being able to

develop some ways of packing that actually represent savings."

New range crate reduces damage on carload shipments

The Tappan Stove Co., one of the first firms to cooperate in the National Safe Transit Program, redesigned a range crate as a result of Safe Transit test results. The new crate has almost entirely eliminated damage previously incurred in carload shipments—and it is less expensive than the crate previously used.

By application of Safe Transit tests to ranges produced at the Mansfield (Ohio) plant of Westinghouse Electric Corp., the company reports savings, for 1949, of \$20,000 due to changes in bracing and packing materials. By means of Safe Transit test results, in one instance, Westinghouse was able to replace a dollar's worth of internal bracing in the product with fifty cents worth of packing, thus saving fifty-cents per range.

Carrier groups launch employee education programs

On the National Safe Transit Committee, representatives of Railway Express Agency, Association of American Railroads, American Trucking Associations, and Air Cargo, Inc., are working closely with shippers and packaging engineers in order to parallel the shippers' efforts with improved carrier facilities and better handling of goods in-transit. The carriers have launched an employee education program designed to teach workers correct methods of loading, unloading, and otherwise handling semi-fragile goods like finished-metal products.

Cooperative effort succeeds

The cooperative effort behind the National Safe Transit Program has produced results which could not possibly have been achieved by individual companies working alone. The larger the number of firms adopting Safe Transit tests, the greater will be the over-all progress towards safer handling and shipping.

Complete information about the purposes, methods, and progress of Safe Transit may be obtained from the National Safe Transit Committee.

1010 Vermont Ave., N. W., Washington 5, D. C.

Safe Transit letters

one of the early participants

To committee chairman:

We of Norge have followed the activities of the National Safe Transit program with great interest since its inception. The range plant is a cer-

tified manufacturer and was one of the early participants in the program.

In reading certain porcelain enamel technical publications, we note that "schools" are being held from time to time for persons interested in the various phases of Safe Transit. We of the range plant would like to be represented at such "schools" if such an arrangement would be favorable with your committee. Although we are following procedures

to Page 58 (Column 3) →



THE R-S TWO-WAY RIDE RECORDER

Weight: 17½ pounds
Case Dimensions: 8" x 15" x 8"

**An Important Unit in the "Safe Transit" Program
Used in the Laboratory and in the Field**

THE R-S Two-Way Ride Recorder meets all of the specifications adopted by the Porcelain Enamel Institute in their standard test procedure. Same sturdy design that has been used so successfully during the past twenty-eight years by both railroads and shippers. A simple and reliable instrument.

The amount of savings realized by many manufacturers who have used this recorder in accordance with the PEI testing procedure are enormous. One manufacturer has reduced losses from 28% to less than 1% because of the adoption of this "pre-transportation" testing. Another manufacturer making 80,000 units per year reports a saving of over \$1 per unit because of saving in more effective, but cheaper and simpler, design of merchandise and crating.

Participate in the "Safe Transit" program as many others are doing. Write for more information on how YOU can save money and protect your products in transit.

"Now available with 16 day clock movement"

THE IMPACT REGISTER CO.

CHAMPAIGN, ILLINOIS

Marked reduction in claims paid on appliances and enameled items

Claims Paid for Loss and Damage on Household Appliances and Plumbers Goods for First 5 Months of 1949 and 1950

| | 1949 | 1950 | Decrease |
|----------------|--------------------|------------------|-------------|
| Plumbers Goods | | | |
| C.L..... | \$ 346,928 | \$235,546 | 32.1% |
| L.C.L..... | 311,956 | 165,698 | 46.9 |
| | <u>\$ 658,884</u> | <u>\$401,244</u> | <u>39.1</u> |
| Stoves, etc. | | | |
| C.L..... | \$ 590,294 | \$335,393 | 43.2% |
| L.C.L..... | 639,769 | 291,722 | 54.4 |
| | <u>\$1,230,063</u> | <u>\$627,115</u> | <u>49.0</u> |
| Refrigerators | | | |
| C.L..... | \$ 423,933 | \$421,480 | 0.6% |
| L.C.L..... | 231,820 | 140,540 | 39.4 |
| | <u>\$ 655,753</u> | <u>\$562,020</u> | <u>14.3</u> |
| Enamelware | | | |
| C.L..... | \$ 210,438 | \$189,139 | 10.1% |
| L.C.L..... | 127,478 | 83,669 | 34.4 |
| | <u>\$ 337,916</u> | <u>\$272,808</u> | <u>19.3</u> |

(Figures are from a report of Freight Claim Division of Association of American Railroads.)

→ from Page 57

as set forth by Safe Transit, we feel active participation in the programs would bring us the most benefit.

If the above meets with your approval, and if dates of future meetings could be made available, we would be happy. May we hear from you?

Norge Division
Borg-Warner Corp.
R. E. Heine
Chief Inspector

first available published material on carloading and bracing Gentlemen:

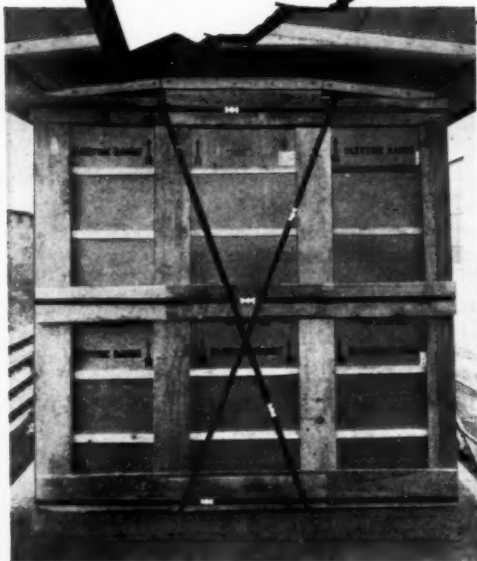
Sometime ago, you wrote us relative to the articles appearing in April, May and June "Finish" on carloading and bracing as advocated by the National Safe Transit Committee.

We were particularly impressed by this presentation in that the methods depicted are in successful use today, and, heretofore, no publication had made this knowledge available.

It is perhaps not common knowl-

"All manufacturing, engineering
and quality efforts are in vain
if the product reaches its desti-
nation in a damaged condition."

PRODUCT PROTECTION IS OUR BUSINESS!



Signode manufactures steel strapping, strapping tools and seals... but that isn't all! Signode also offers its customers, large or small, a complete system of product protection. This service begins in your shipping room with a qualified analysis of your packing and shipping practices, follows with recommendations for improvements in container design and car bracing methods, ends only when your product is delivered to your customer in the same fine con-

dition it left your plant.

Back of this operation are the most extensive research facilities in the steel strapping industry... a packaging laboratory, a full-size outdoor railroad test track, a staff of engineers who spend all their time working with customers in the field—to mention only a few.

If you would like to find out what we've learned about shipping products like yours... better, faster, at less cost... write

SIGNODE
STEEL STRAPPING COMPANY
2639 North Western Avenue, Chicago 47, Illinois

THIS SEAL MEANS

SIGNODE

SECURITY IN SHIPPING

edge, the amount of time, talent and engineering that was expended in the development of these loads, and generally speaking, the information you have portrayed can be directly applied and adopted by many shippers.

This writer has seen and worked with these loading principles, having spent a number of years in this type of work.

O. T. Sands
Chief Packaging Engineer
Packaging Division
Sears, Roebuck and Co.
Chicago, Illinois

this material on carloading and bracing is now available in booklet form from the National Safe Transit Committee, 1010 Vermont Avenue, N.W., Washington 5, D. C.

Military packaging problems

At a meeting of the Munitions Board Packaging Industry Advisory Committee, in Washington, D. C., on September 8, further progress was made on the coordination of Military packaging specifications, according to Heinz H. Loeffler, president of Exeter Paper Company, and chairman of the Planning Sub-Committee.

Some of the topics discussed included interior and exterior packaging of Military goods, a proposed packaging training program for Military personnel, and the availability of packaging materials.

Industry chairman for the Packaging Advisory Committee is Neil A. Fowler, director of sales and research, General Box Company. Rear Admiral Morton L. Ring, USN., director of supply management, Munitions Board, is the Government chairman of the Committee.

The Packaging Advisory Committee is an outgrowth of the former Packaging, Storage, and Materials Handling Industry Advisory Committee. This Committee will work closely with the Munitions Board's Joint Packaging Committee in order to standardize materials and methods used in packaging for the Military, it was stated.

WHAT
DO USERS
SAY
ABOUT

Wirebound?



(this)

Report by flexible power saw company shows shipping weight reduced from 820 to 775 pounds, tare weight cut 20%, crating time slashed 30%. Company stacks units four high—placing 2325 lb. load on bottom Wirebound. Shipping damage due to container failure has been completely eliminated.

(this)

World's largest manufacturer of portable electric tools now ships its 290 lb. universal valve and tool grinder in a Wirebound weighing only 39 lbs. The protection against shipping jolts and shocks afforded by the steel wire—thinner wood construction of Wirebounds is so effective that machine tolerances of .005 are now maintained.



(and this)



Maker of 310 lb. motor tractor chose Wirebound boxes when first entering export market for the anti-pilferage feature of the twisted wire closure (other closures available) . . . found shipping operations moved easily . . . packing took just 15 man minutes including interior bracing and Wirebound mat which wraps around all 4 sides.

choose your course of action

Wirebound
BOXES & CRATES

- ☐ Send me general information . . . complete descriptive book titled "What to Expect from Wirebounds."
- ☐ Send me specific information . . . tear sheets of case histories of packing products similar to mine.
- ☐ Give me direct action . . . send a sales engineer to show the advantages of Wirebound packing for my own product.

NAME _____

FIRM _____

STREET AND NUMBER _____

CITY _____

POSITION _____

ZONE _____ STATE _____

OUR PRODUCT IS _____ IT WEIGHS _____

WIREBOUND BOX MANUFACTURERS ASSN.

Room 1134 - 327 South LaSalle Street
Chicago 4, Illinois

Users' names on request.

mail now to

Companies cooperating in Safe Transit program

THE following companies are certified under the National Safe Transit Program. They are privileged to use the N.S.T. Label.

Admiral Corporation
Chicago, Illinois

American Central Div., Avco Corp.
Connersville, Indiana

American Stove Company
Cleveland, Ohio

American Stove Company
St. Louis, Missouri

Andes Range & Furnace Corporation
Geneva, New York

Apex Electrical Manufacturing Co.
Cleveland, Ohio

Appliance Manufacturing Company
Alliance, Ohio

Automatic Washer Company
Newton, Iowa

The Bellaire Enamel Company
Bellaire, Ohio

Belmont Stamping & Enameling Co.
New Philadelphia, Ohio

Caloric Stove Corporation
Topton, Pennsylvania

Canton Stamping & Enameling Co.
Canton, Ohio

Central Rubber & Steel Corporation
Findlay, Ohio

Chambers Corporation
Shelbyville, Indiana

Conlon Bros. Mfg. Co.
Chicago, Illinois

Conlon-Moore Corporation
Chicago, Illinois

Cribben and Sexton Company
Chicago, Illinois

Crosley Division, Avco Mfg. Corp.
Richmond, Indiana

Crunden Martin Manufacturing Co.
St. Louis, Missouri

The Dexter Company
Fairfield, Iowa

Dixie Foundry Company, Inc.
Cleveland, Tennessee

Federal Enameling & Stamping Co.
Pittsburgh, Pennsylvania

The Fletcher Enamel Company
Dunbar, West Virginia

The Floyd-Wells Company
Royersford, Pennsylvania

General Electric Company
Erie, Pennsylvania

Globe American Corporation
Kokomo, Indiana

Hardwick Stove Company
Cleveland, Tennessee

Hotpoint, Inc.
Chicago, Illinois

International Harvester Company
Evansville, Indiana

Kaiser Metal Products, Inc.
Bristol, Pennsylvania

Landers, Frary & Clark
New Britain, Connecticut

A. J. Lindemann & Hoverson Co.
Milwaukee, Wisconsin

Lisk-Savory Corporation
Buffalo, New York

Malleable Iron Range Company
Beaver Dam, Wisconsin

The Maytag Company
Newton, Iowa

Meadows Division, Thor Corporation
Bloomington, Illinois

Moffats, Limited
Weston, Ontario, Canada

The Moore Enameling & Mfg. Co.
West Lafayette, Ohio

Murray Corporation of America
Scranton, Pennsylvania

Murray Manufacturing Company
Murray, Kentucky

Nash-Kelvinator Corporation
Grand Rapids, Michigan

Nashville Division, Avco Mfg. Corp.
Nashville, Tennessee

National Enameling & Stamping Co.
Milwaukee, Wisconsin

Norge Division, Borg-Warner Corp.
Effingham, Illinois

Norge Division, Borg-Warner Corp.
Herrin, Illinois

Norge Division, Borg-Warner Corp.
Muskegon Heights, Michigan

Perfection Stove Company
Cleveland, Ohio

Philco Corp., Refrigerator Division
Philadelphia, Pennsylvania

Republic Stamping & Enameling Co.
Canton, Ohio

Geo. D. Roper Corporation
Rockford, Illinois

A. O. Smith Corporation
Kankakee, Illinois

Speed Queen Corp., Ironer Division
Algonquin, Illinois

The Tappan Stove Company
Mansfield, Ohio

Thor Corporation
Chicago, Illinois

United States Stamping Company
Moundsville, West Virginia

Westinghouse Electric Corporation
East Springfield, Mass.

Westinghouse Electric Corporation
Mansfield, Ohio

Certified Safe Transit Laboratories

Atlas Plywood Corporation
Lawrence, Massachusetts

Chicago Mill and Lumber Company
Chicago, Illinois

Container Laboratories, Inc.
Chicago, Illinois

Cozier Container Corporation
Cleveland, Ohio

The Fairfield Paper & Container Co.
Baltimore, Ohio

General Box Company
Chicago, Illinois

The Hinde & Dauch Paper Company
Sandusky, Ohio

Inland Container Corporation
Indianapolis, Indiana

International Paper Company
Georgetown, South Carolina

Ohio Boxboard Company
Rittman, Ohio

Package Research Laboratory
Rockaway, New Jersey

Packaging Service Corporation
Wyncote, Pennsylvania

Don L. Quinn Company
Chicago, Illinois

U. S. Testing Company, Inc.
Hoboken, New Jersey

Safe Transit reduced our shipping damage

a brief story of pre-testing, re-designing, and remarkable results

by *H. W. Bonner* • PACKAGING ENGINEER, MOFFATS LIMITED, WESTON, ONTARIO, CANADA

THE program of National Safe Transit has met with hearty approval by all concerned at Moffats Limited. We have made extensive research on our packaging problem with the aid and very co-operative officers of the Safe Transit Committee.

To enlighten you on our progress since we have received the National Safe Transit approval, I will give you briefly the details of how we use the NST program.

Since November of 1949 we have made extensive tests on all our range and refrigerator lines, and, based upon the results we received, the design of our packaging was changed as well as a few changes in range design.

Damage reduced from 24% to 2%

At the time of our application for National Safe Transit our damages

on an overall picture were 24%; this has now been reduced to 2% through our tests and with the co-operation of both our National Railroads (CPR & CNR). These railroad officials have made periodic inspections of our tests, as the enclosed letter from Canadian Railroads will bear out.

Test one range from each production run

One range from each production run per week is tested and the records are used to keep our quality always at a top level.

Here is what H. D. Angus, chief inspector, claim prevention, Canadian National Railways, has to say in a letter to district freight claim agents:

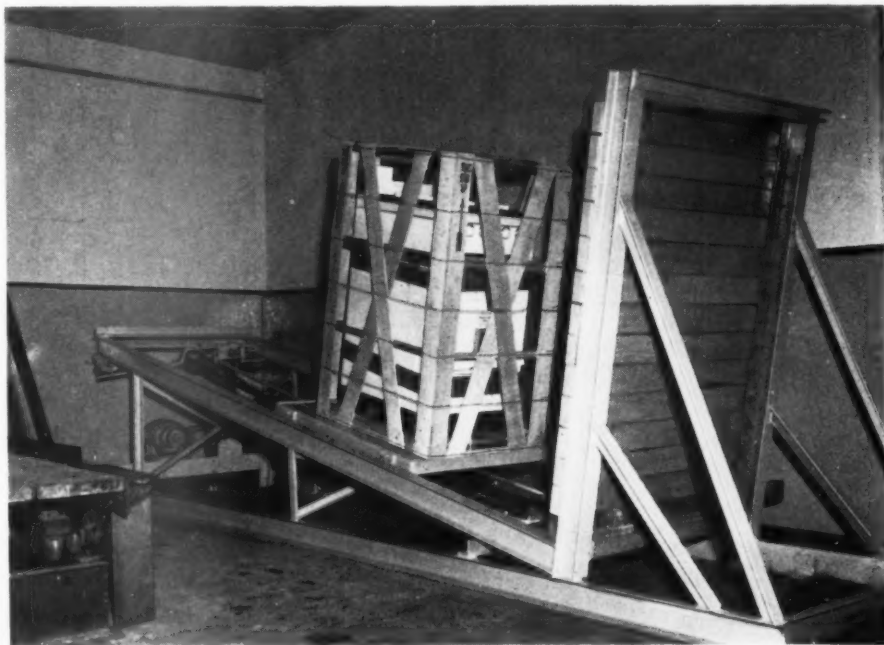
"From the demonstration that was given to us, there is no doubt that their (Moffats Limited) production will stand up under more than the ordinary handling. . .

"We do not see how shipments of this firm can be damaged by anything short of train derailment or accident. We feel quite confident that there will be very few damage claims from this firm from now on."

In his letter, Mr. Angus also points to our use of the Conbur incline impact tester and the vibration tester specified by the NST Committee, and to the fact that we take stoves from the assembly line for test in order to show up any defects in the manufacture. In addition, he comments on our new crate, which at no point is nearer than three inches to the stove itself.

We are thankful to the National Safe Transit Committee for the inauguration of a successful constructive program, and this information will indicate our success with it and enthusiasm for it.

Photo shows use of the Conbur incline impact tester specified by the National Safe Transit Committee. Also visible, in left foreground, is a corner of a vibration tester specified by the NSTC.



What happens to your product in transit

summary of test data compiled by the Sub-Committee of the Technical Planning Division of the National Safe Transit Committee

WORKING with Air Cargo, Inc., American Trucking Associations, Inc., Association of American Railroads, and others in the National Safe Transit Committee, this information collected by the Sub-Committee of the NST Technical Planning Division shows the vibration and shocks as received by the PACKAGED PRODUCT from the manufacturer's production line to the final customer, including shipment by any one of our common carriers.

It has required many months and thousands of miles of test shipments to secure average conditions encountered. It was necessary to mount shock recorders in railroad cars, trucks and cargo planes. Instruments were shipped in wooden boxes prepared as ordinary packaged products so as not to create any unusual attention which would destroy the value of the test shipments.

The recorders used in all tests were

standard 2-way ride recorders which record both vertical and longitudinal shocks, with two recorders mounted so that shocks in all four directions could be measured. The recorders also permitted the actual time of the day to be determined when shock occurred, thus enabling very close correlation between airplanes, trucks and train schedules and the like, so that it was possible to know at exactly what points shock took place. Without this information it could only be shown that the shock took place, the reason for it might not be known.

The information contained was gathered to correlate the test procedures of the National Safe Transit Program with actual conditions encountered by the PACKAGED PRODUCT in transit, which, of course, includes all handling as well as during the time the carrier's vehicle is used. It is again pointed out that it is most important that all phases of the itin-

erary from the manufacturer to the ultimate destination be covered or otherwise some of the most detrimental shocks might not be measured.

This information is not intended in any way to show any differences

Technical Planning Division Sub-Committee

P. W. Bush, Chairman
Westinghouse Electric Corp.
Mansfield, Ohio

F. A. Petersen
University of Illinois
Urbana, Illinois

H. Geo. D. Nutting
L.A.B. Corporation
Summit, New Jersey

E. C. Manthei
The Impact Register Company
Champaign, Illinois

Laboratory technician examining shock recorder data following a test.



in methods of transportation. However, it does point out that in any and all methods of transportation, taking an average of several shipments, the shocks will be found to be pretty much of the same magnitude with the MAXIMUM SHOCKS occurring in any mode of transportation usually during HANDLING BY PEOPLE. This also includes such items as car shifting, trailer or truck movements in which most cases are handled or controlled by the personnel in charge of the particular carrier vehicle.

This information adds up to show the shocks, as prescribed in the procedures of the National Safe Transit Committee, well in correlation with those actually received by a PACKAGED PRODUCT. Therefore follows the accompanying Statement of

Foreword

Presenting for the first time to industry, the information showing the magnitude of shocks that Packaged Products will receive with average handling from the manufacturer's production line to the ultimate consumer.

Much has been done in the past to show shocks in trucks, railroad cars and airplanes, but to record shocks from manufacturer to ultimate destination is a bit more difficult in that (a) recorders must be concealed, (b) recorders must run longer, and (c) recorders must record in four directions.

This (a, b & c) shows the handling shocks prior to shipping, the loading shocks, vibration shocks due to actual movement of truck, railroad car, or airplane.

There are longitudinal shocks in shifting trailers and trains, plus the load shifting within the carrier. In addition there are shocks incident to unloading, warehousing, and delivery (handling to ultimate destination).

This report points out that from manufacturer to ultimate destination, the most serious hazards to a Packaged Product result from "handling."

*Sub-Committee, Technical Planning Division
National Safe Transit Committee*

Policy of the Safe Transit Committee.

The accumulation of data as outlined herein, plus other previously reported information, goes to make up what constitutes probably one of the most comprehensive files of in-transit shock data covering shipments from the manufacturer's production line to ultimate destination. Now available for the first time, this data is not confined to shipments while in the carrier's vehicle, which is what had been used as a measure up to this time.

This is all a scientific confirmation of the National Safe Transit Committee's whole program.

Functions of the Sub-Committee

The Sub-Committee of the NST Technical Planning Division functions as a working committee, and is concerned with the following:

1. Approval of test equipment facilities of laboratories and manufacturers prior to certification by the National Safe Transit Committee.
2. Follow up of those purchasing test equipment for the National Safe Transit Program to assure its proper use.
3. Research and investigation of new test equipment.
4. Accumulate research data on in-transit and handling shocks in cooperation with all the national carrier associations.
5. Use of data for correlating National Safe Transit tests with actual in-transit and handling shocks.
6. Educational follow-up on questions of a technical nature pertinent

of the National Safe Transit Program. Clarification of NST procedures.

Background of test data developed by Sub-Committee

There was a great deal of background information and test data available from a few participating manufacturers who had employed similar testing procedures to those specified by Safe Transit over a period of some 15 years.

All of the early information was confined to data resulting from test shipments by rail. When the National Safe Transit Program was established, it was decided that it was very important to include tests of all hazards from the time the PACKAGED PRODUCT leaves the assembly line until it reaches its final destination. Therefore, test shipments were made by all major methods of transportation, including railway express, railroad freight (LCL and carload), truck, and air. Then, special emphasis

was placed on testing of inner-plant handling and special truck shipments which would be the equivalent of local delivery.

All in all, some 75,000 miles of test shipping has been conducted and the data recorded. As the accompanying data will show, the broadening of the Safe Transit Program to include handling and local delivery was of major importance as all correlated data points to the fact that major shocks are encountered under handling conditions in the great majority of cases rather than while in the carrier's vehicle.

Air cargo tests

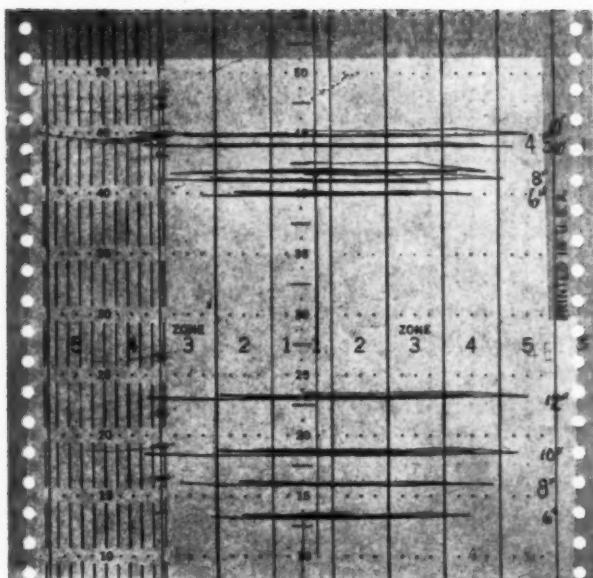
Some 15,000 miles of air cargo tests were made and correlated with the test procedures of the National Safe Transit Program. Four of the major air lines cooperated in the program through Air Cargo, Inc., by carrying test shipments over specified routes and by having technical men

STATEMENT OF POLICY

The National Safe Transit Committee is simply saying to shippers:

"If you will test your packaged products by these test procedures, experience has shown that your loss and damage and your packaging costs will be acceptable minimums. It is up to each shipper to decide whether or not he will use these test procedures. The program is entirely voluntary and implies no connection with tariffs, freight rates, claim procedures or any other existing transit regulations."

NATIONAL SAFE TRANSIT COMMITTEE
1010 Vermont Ave., N. W., Washington 5, D. C.



Handling prior to shipping



Unloading



Subsequent handling to final destination



Handling Shock Measurements — This recording tape shows shocks as received by a Packaged Product when handled on a 2-wheel truck and the leading end of the crate permitted to fall to the floor from different heights (6", 8", 10" & 12" as shown on tape). Drawing at right shows typical handling shocks. The shock recorder was attached to the crate side. The Packaged Product was an automatic dishwasher in a crate 38" high by 29" x 28" base size, with a gross weight of 200 lbs.

cooperate with the Sub-Committee.

Arrangements were made with top personnel of the cooperating lines so that test shipments could be made without attracting attention as special cargo. Attention was given to transfer points so that they would represent a good cross section as to type and location of transfer; such as, transfer from air line terminal in metropolitan area to the airport.

It was found that, in all instances, maximum shock was encountered during handling and not while in transit. The only time shocks entered the 5th zone of shock was during handling (unloading, handling at airport, and unloading).

Railway express tests

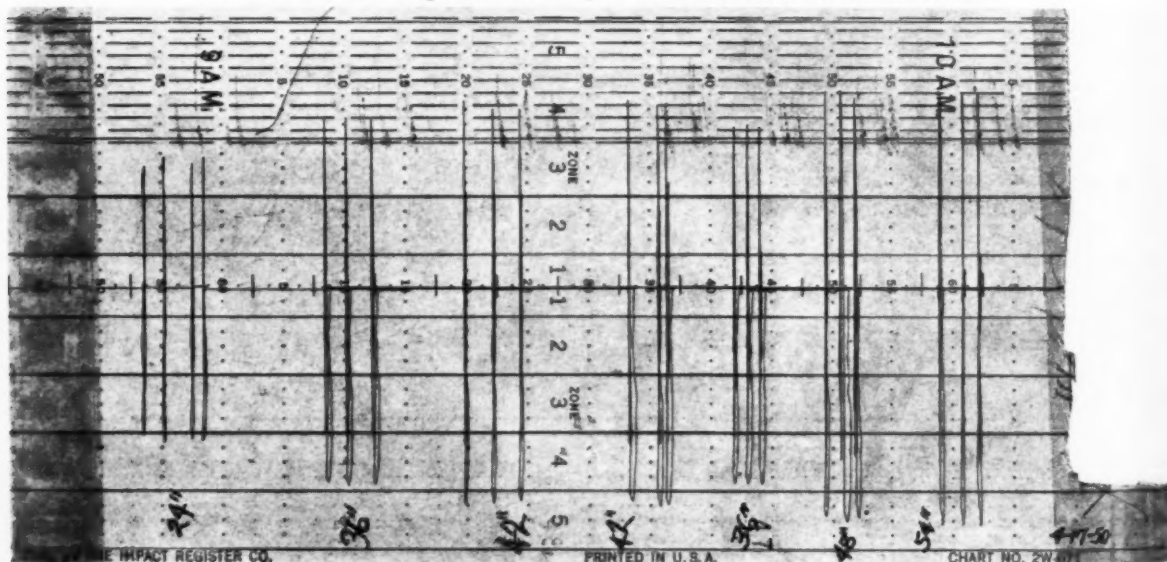
Through cooperation with the Railway Express Agency, tests were made

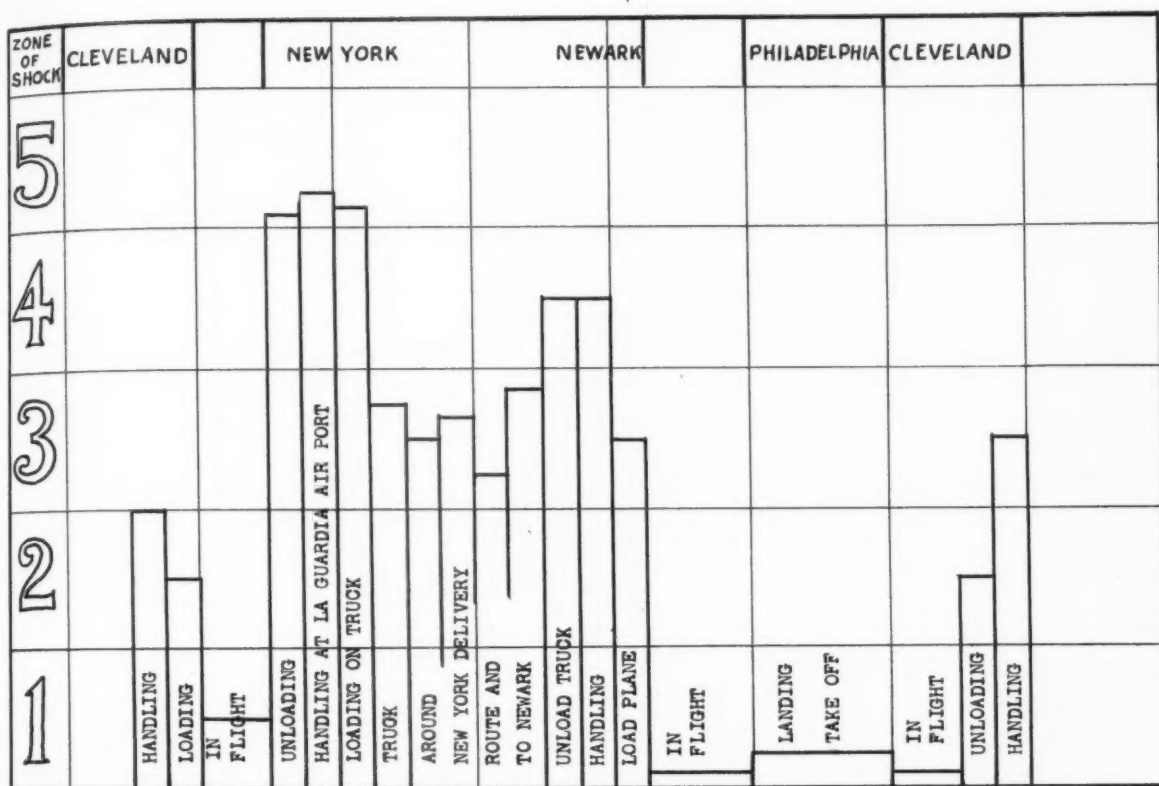
under normal conditions of shipment in express cars. Five different railway systems were involved. Here again, the actual shocks during the movement of the railway cars were less than those encountered during the actual unloading and loading.

Test shipments by railroad freight

Dozens of test shipments were made by railroad freight, both car-

Conbur Shock Measurements — This shows shocks as received by a Packaged Product when released on the Conbur test at the various points as indicated. The shock recorder was attached to the bottom side to measure the shock. The Packaged Product was the same as the one mentioned above.





The illustrations on this page show the shocks as received by a Packaged Product shipped as air cargo from Cleveland to New York to Cleveland, including truck transportation from LaGuardia airport to Newark airport.

load and LCL. Very close correlation was obtained as a result of these tests. Here again, in practically every instance, it was found that in loading

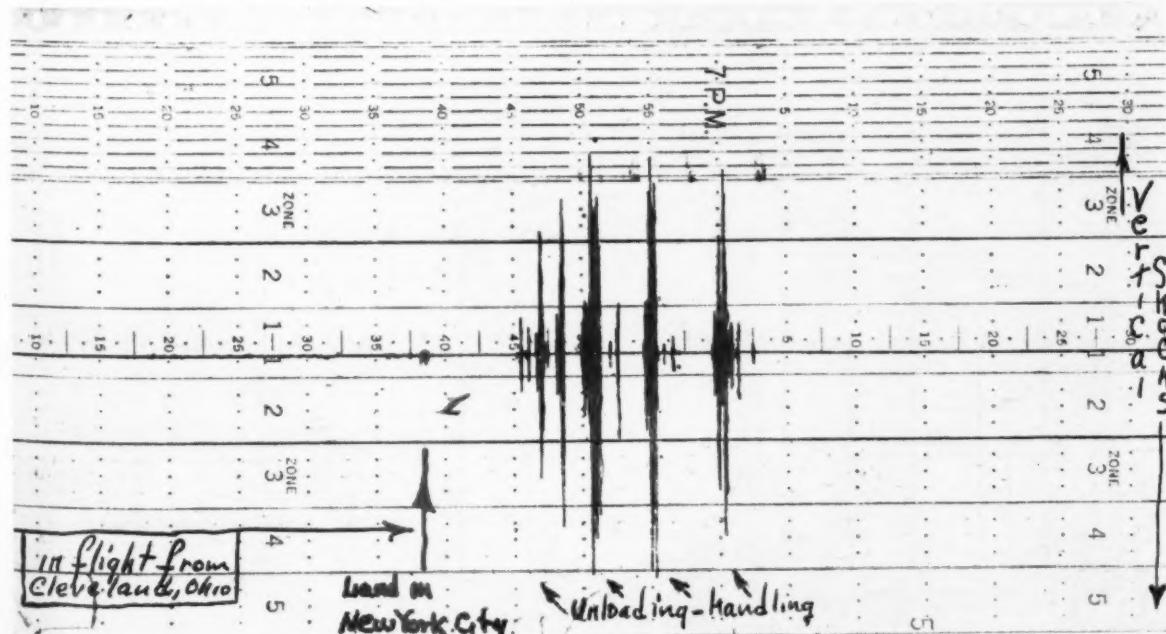
and unloading, shocks were incurred in or approaching the 5th zone. Some shipments did not show 5th zone impact at any point during car move-

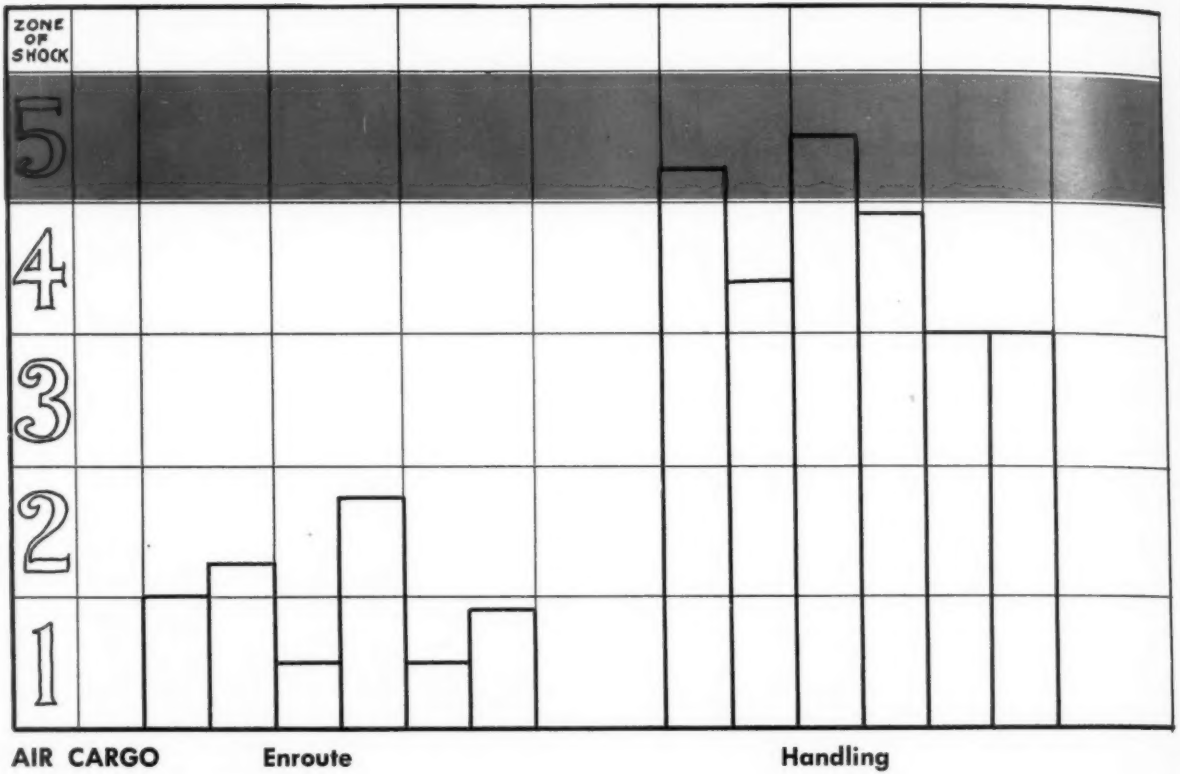
ment. Some shocks extending into the 5th zone were encountered dur-

to Page 68 →

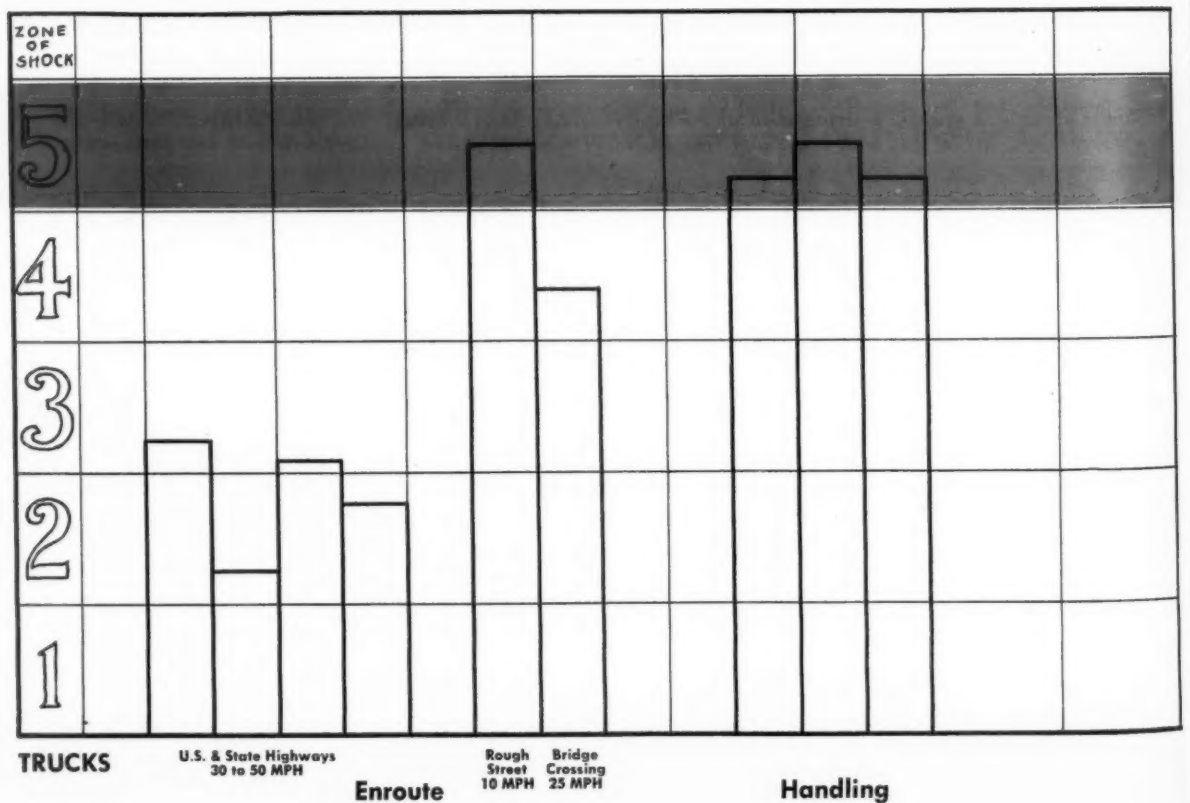
Summary of test shipments . . . →

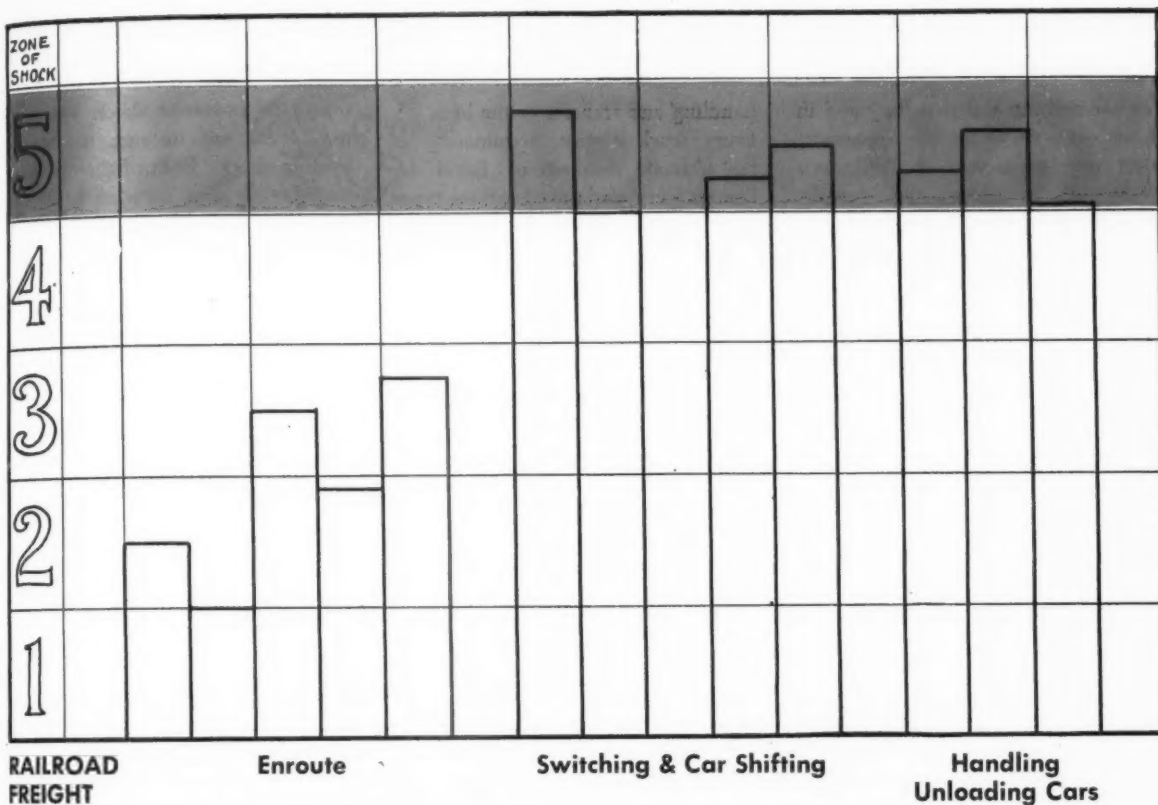
Shown above is a graphic interpretation of the tape recording shown below. The test Packaged Product was a wooden box, wt. 70 lbs., with two 2-way ride recorders mounted inside, one vertically and one horizontally.



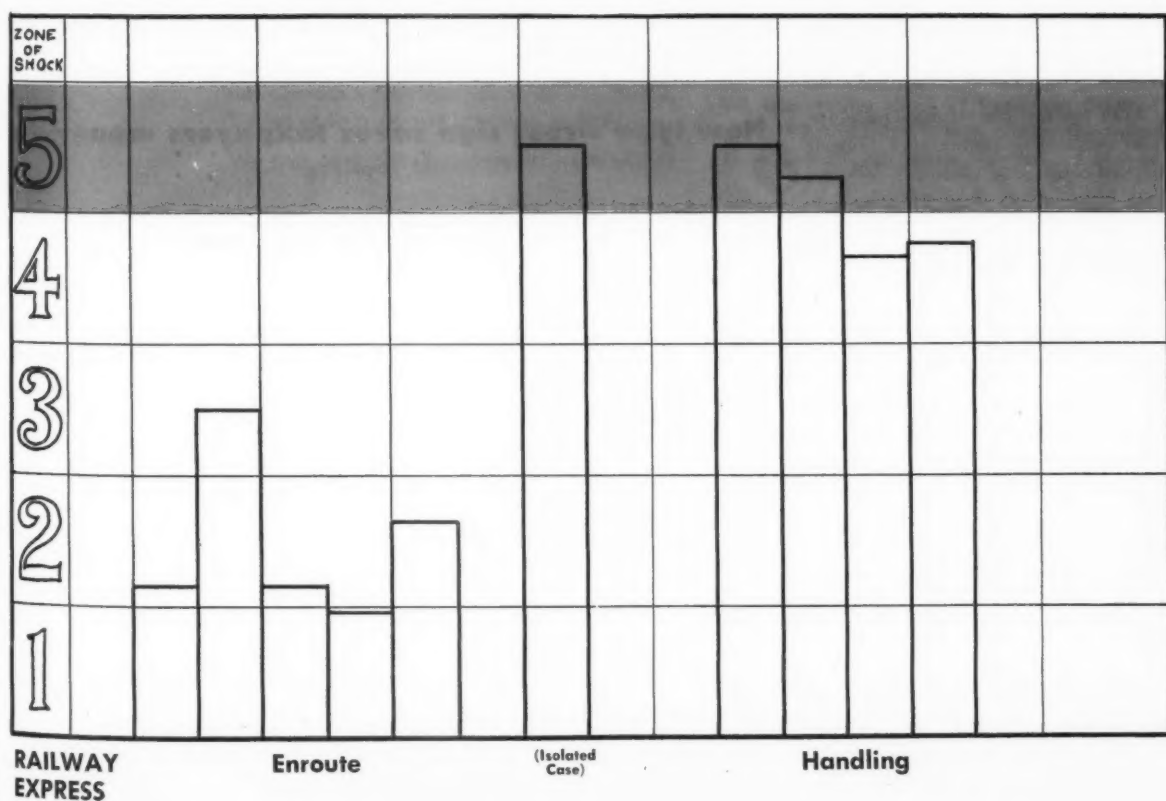


Summary of averages for all test shipments





... for all modes of transportation



What happens to your product in transit

(Continued from Page 65)

ing car shifting and switching and in a few cases where the car apparently went into resonance. A "Shipment to Detroit, Michigan", for example, showed two points of shock into the 5th zone, both representing car switching.

Truck data

Data on truck shipments was obtained through cooperation with the American Trucking Associations and its members. Test periods cover 18 months. This covers in-route conditions by the manufacturer and truck line terminal and interline transfer to another truck line and thence to its ultimate terminal destination and

handling and transfer to the local delivery truck system, terminating at the ultimate destination. Local deliveries were made over various types of National and State Highways, County and Rural Roads, plus normal delivery routes in several cities. In some instances, the technician actually rode the trucks with a stop watch in order to record points of apparent greatest shock and later to check these against the tape record on shock recorders; such as, rough streets, railroad crossings, etc. Under these conditions, the truck driver was instructed to hit certain hazards at specified speeds in order to accumulate data. As in all other instances,

handling shocks represent the maximum with the exception of unusual hazards. Under these forced conditions, the in-transit shock was comparable in one instance to the unloading shock. Both of these shocks, into the 5th zone, correlated with the 12" drop test in the laboratory.

Summary

1. The worst shocks under all conditions observed in the majority of cases occurred during handling.
2. The 5th zone established as the minimum requirement for the PACKAGED PRODUCT under the National Safe Transit Program represents no more than the conditions normally encountered in transportation and handling.

The application of standard test methods

(Continued from Page 33)

to withstand use under normal conditions of use. In order to obtain an answer to this question sets of test pans have been placed in homes around Champaign-Urbana for varying lengths of time (12-26 months).

Results from "in the home" tests

After the test period these pans are collected and examined for impact, thermal shock, and solubility failures. Any iridescence, loss of gloss, or staining is listed as a solubility failure, and crazing of pan bottom or popped-off areas are listed as thermal shock failures.

Since February in 1945 four series of test pans have been in use and returned for examination. Of 429 pans checked, less than one percent were not any longer usable on return.

A critical review of the results of service tests indicates that an enameled utensil having solubility resistance of .005 gms./square inch or better will withstand normal home use. If the utensils have thermal shock resistance of 8 cycles or more they will give exceptionally good service in home use.

The thermal shock test and solu-

bility test results correlated very well with home service test results, but in the case of impact test results the correlation was not very good.

The data presented shows the improvements being made in the ware produced by the manufacturers. Cer-

tainly a part of this improvement is due to the use of standard test methods which are used to plot the changes as they are made. These test methods are doubly valuable since the test results correlate with regular home use.

Adapted for *finish* from a paper before the Porcelain Enamel Institute's 12th annual forum for plant men.

New type street sign saves taxpayers money

(Continued from Page 34)

of Waltham, Mass., received the contract for Chicago's first 25,000 signs on a bid of \$1.67, which was the lowest of 11, with the others ranging from \$2.25 to \$4.65. Michel estimates that this new design should enable a firm like Bettinger to supply smaller quantities to other cities at approximately \$3.50 a sign.

The secret of Michel's design is in the use of relatively heavy (14 gauge) enameling iron, which he oppositely flanged at the top and bottom to give it structural strength. This is welded to a mounting channel of 12 gauge enameling iron, with holes on the face for bolting to fasteners on steel poles, pedestals or columns and slots on the sides for banding to bronze, concrete or cast iron poles. Since the sign is all one piece, there is nothing

to assemble, and it is simple, functional, and durable.

In the Loop, where installation of the first thousand signs started in mid-July, all signs are being installed with stainless steel fasteners which are end-welded to the steel poles in an instant with a stud welding gun. This method provides permanent anchorage for the signs, which can support a weight of 440 lbs. at the outer end.

The use of these flat signs, with 4½" letters in black against a yellow background on both sides of a single sheet of steel, according to Michel, means that it will be easier to keep the signs clean, and that sign replacement will be required only about every 50 years.



We'll pitch it to you straight...

Here's a real ringer for you, and a high-point scorer in your production schedule! Perhaps you are a parts supplier who is buying stampings from one source and having them enameled at another. Perhaps you are operating your own enameling plant to capacity and wish you had added facilities. Or, perhaps you are a producer of stampings but do not operate a finishing plant. In any event, Vitreo is in a perfect position to help you.

We can offer the complete facilities of our

stamping and enameling plant to increase your output. In addition, we can help you in the design and planning of any product which will ultimately boast the perfect finish—Porcelain Enamel.

Write us immediately on your company letterhead, or simply use the handy coupon below to see how we can work for you. For the fascinating story of Porcelain Enamel, request your copy of a beautifully illustrated 16 page booklet. No obligation, of course.

Mail this coupon for FREE BOOKLET!

FREE!

VITREOUS STEEL PRODUCTS COMPANY
Box 1791, Cleveland 5, Ohio

- ☐ Enclosed is a rough sketch of what we are planning on having Porcelain Enameled. Please rush us your suggestions.
☐ Send us the 16 page Porcelain Enamel booklet.

Name Title

Company

City Zone State

Product Manufactured

Plan for the Lifetime Finish

VITREOUS STEEL PRODUCTS CO.

BOX 1791, CLEVELAND 5, OHIO (Factory at Nappanee, Ind.)

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"I saw your ad in finish"

CLASSIFIED ADVERTISING

RATES

| Display classified | 1 li. | 6 li. | 12 li. |
|------------------------------|-------|-------|--------|
| 1" to 2" inclusive, per inch | 9.00 | 8.00 | 7.00 |
| 3" to 5" inclusive, per inch | 8.50 | 7.50 | 6.50 |
| 6" to 9" inclusive, per inch | 7.50 | 6.50 | 5.50 |

Measured in vertical column inches, columns 2 1/4 inches wide. Accepted in column inch multiples only. Add 25% for reverse plates.

POSITION

WANTED

Enamel Expert. Must have full knowledge of porcelain enamels, identify manufacturing and transportation defects, also ability to get results without friction with others. Traveling required. Furnish complete record, photograph, and salary desired.

Address reply to Box 1050, c/o finish, 360 N. Michigan Ave., Chicago 1, Ill.

EQUIPMENT

AVAILABLE

Koch-DeVilbiss Dry System automatic spray unit in pressurized room with 40' long tunnel dryer system. New in 1946. Fraction of regular cost. Finest unit of its kind in East. Write, wire, or telephone for full details, photos, etc.

United Sound & Signal Co., Inc.
Columbia, Pennsylvania

The 49th annual convention of the Canadian Ceramic Society will be held January 15-17 in Montreal, Quebec, at Mount Royal Hotel.



5 OTHER GOOD REASONS FOR USING PORCELFRIT

1. **FEWER REJECTS**—Rejects cut your profits and PORCELFRIT cuts rejects to a minimum.
2. **SERVICE ENGINEERING**—Our service engineers are available to make sure that PORCELFRIT works right for your product . . . You take no chances.
3. **LABORATORY CONTROL**—Our ceramic engineers maintain constant contact with the production staff to make sure of highest quality.
4. **IMPROVED SMELTING**—Ing-Rich uses unquestionably the world's finest smelting method, the result of exhaustive research and experiment.
5. **EXPERIENCE**—Since 1901 Ing-Rich has pioneered in porcelain enameling. We have learned a lot in that time—and our customers profit by it.

☆ At the start of a season, any football team is an unknown quantity. It's only when the team has been tested in action . . . after you've seen how it goes when the chips are down . . . that you can form a sound opinion.

The same is true of frit. Except this: you don't have to guess about PORCELFRIT, because it is plant-tested right in our own job enameling department *before* you get it. We use it as you use it . . . and in so doing we can tell at first hand what needs correcting. Result: when *you* get it, it's *right*.

Tie up with the team that's *tested in action*—specify Ing-Rich PORCELFRIT!



INGRAM-RICHARDSON MFG. CO., OF INDIANA, INC.
OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA, U.S.A.

Improved casting production practice

→ from Page 24

Since much work which was formerly made in oven baked molds has now been supplanted with skin dried practice, the saving in mold cost is obvious. In addition, the castings made in skin dried molds are much

less crack sensitive than those made in baked molds. The practice so developed has virtually eliminated metal penetration in this class of work and developed freedom from scabbing with the result that a much higher level of casting cleanliness has been made possible. Cleaning costs have been correspondingly reduced in di-

rect proportion to the improvement in casting quality.

Using the header box casting (Figure 2), estimates of comparative molding and cleaning costs show a saving of \$5.87 per casting or a reduction of 21.9% in the cost of molding and cleaning. The tabulated data is shown in the chart.

Australian appliance producers expanding production

by C. M. Andrews • TECHNICAL MANAGER, INTERNATIONAL DIVISION, FERRO ENAMEL CORP.

AUSTRALIA has planned for, and is looking forward to, one of the most prosperous eras in its relatively short history. Soon after the last war, economists and government officials realized the necessity of developing the country's great wealth of natural resources, expanding its industries and increasing home markets, and planned accordingly. Consequently, this development program is now going forward with all the aids of modern science.

A much larger labor force is required to carry out this ambitious program than is available from Australia's limited population. Therefore a plan was inaugurated to bring in a minimum of 200,000 carefully screened people yearly from other countries. Although this immigration policy imposes a temporary strain on economic and social structures, it also adds to the purchasing power and helps toward the estab-

lishment of a self-contained economy.

To house this influx of immigrants, government officials estimate that building construction must be increased by 110%. This boom in house building has, of course, resulted in a big increase in the demand for household appliances, sanitary ware, holloware, and other products using porcelain enamel. Manufacturers of these items have been producing to the limit of their steel and iron supplies, and look forward to even greater production as allotments of these metals increase.

Color growing in popularity

Stoves and refrigerators are in great demand and the market for washing machines is steadily increasing. It was interesting to observe that over 80% of the household appliances and holloware produced in Australia were finished in pastel colors and the two most popular colors were cream and green. Only a few white stoves and refrigerators are made because of this preference for color in the kitchen.

The bathtubs, lavatory bowls, sinks and other sanitary ware produced are mostly cast iron, but a few manufacturers have started to fabricate and enamel welded sheet steel bathtubs and sinks. At present the demand for both iron and steel sanitary ware is much greater than the supply and therefore quite a few plants plan to expand to increase production facilities.

Jobbing plants are also working to maximum capacity and in many cases have to turn work away. Signs make

up a large percentage of jobbing work, but there is also quite a volume of refrigerator and stove work to be enameled for manufacturers not having such finishing facilities.

Due to the limited capacity of the Australian rolling mills, it has been necessary to import considerable amounts of sheet steel for enameling from Belgium and Japan. Some has been imported from the United States, but, because of the dollar shortage, tonnages from U.S. are small. However, the steel industry is installing more sheet rolling equipment and they hope to soon be in a position to supply the Australian market.

The increased usage of porcelain enamel in foreign countries is not confined to Australia. Ferro subsidiary companies in Canada, England, Holland, France, Brazil, Argentina, and Australia report an overall increase of approximately 20% in enamel frit sales for the first six months of 1950 over the same period in 1949, which was a record year for foreign sales.

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Editor's Note:

"Cliff" Andrews is well-known in porcelain enameling circles, having been connected with Altorfer Bros., the Ingersoll Steel Division of Borg-Warner, and McCray Refrigerator Co. He was later associate research professor at the University of Illinois, and at the time co-authored one of the first feature articles in *finish* on the subject of titania opacified enamels. Cliff has been with the International Division of Ferro for the past five years, and returned recently from a 6-week visit to Australia.